



King's Research Portal

DOI:

[10.1080/13563467.2013.768611](https://doi.org/10.1080/13563467.2013.768611)

Document Version

Peer reviewed version

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Baines, J. (2014). Food Price Inflation as Redistribution: Towards a New Analysis of Corporate Power in the World Food System. *NEW POLITICAL ECONOMY*, 19(1), 79-112.
<https://doi.org/10.1080/13563467.2013.768611>

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.

Food Price Inflation as Redistribution: Towards a New Analysis of Corporate Power in the World Food System

JOSEPH BAINES

York University, Department of Political Science, 4700 Keele Street, Toronto, Ontario, Canada.
Email: jbaines@yorku.ca

This is an Author's Accepted Manuscript of an article published in New Political Economy, April 22, 2013, [copyright Taylor & Francis], available online at:
<http://www.tandfonline.com/doi/full/10.1080/13563467.2013.768611>

Abstract

This paper outlines the contours of a new research agenda for the analysis of food price crises. By weaving together a detailed quantitative examination of changes in corporate profit shares with a qualitative appraisal of the restructuring in business control over the organisation of society and nature, the paper points to the rapid ascendance of a new power configuration in the global political economy of food: the Agro-Trader nexus. The agribusiness and grain trader firms that belong to the Agro-Trader nexus have not been mere 'price takers', instead they have actively contributed to the inflationary restructuring of the world food system by championing and facilitating the rapid expansion of the first-generation biofuels sector. As a key driver of agricultural commodity price rises, the biofuels boom has raised the Agro-Trader nexus's differential profits and it has at the same time deepened global hunger. These findings suggest that food price inflation is a mechanism of redistribution.

Keywords: global food crisis, capital as power, redistribution, Agro-Trader nexus, bio-fuels, commodity prices

There isn't one grain of anything in the world that is sold in a free market. Not one! The only place you see a free market is in the speeches of politicians. (Dwayne Andreas, CEO of the world's second largest grain firm – Archer Daniels Midland – from 1972–98; interview excerpt from Carney 1995)

The turn of the millennium marked a sea change in the world food system. After a two decade decline, food prices trended upward. From 2006 to 2008 food price rises accelerated and the number of undernourished people in the world increased to over 1 billion. Food riots erupted in 30 countries. There was a temporary reprieve from price

hikes in 2009, but in the following year much of humanity was drawn into another brutal round of food price inflation. By January 2011 the Food and Agricultural Organization's food price index had surpassed the levels scaled during the previous crisis and again widespread upheaval ensued. Unrest crested during the Arab Spring but social discontent is evident far beyond the Middle East and the Maghreb. Indeed, all over the world people have poured onto streets in protest against the rising cost of living.

This severe bout of food price inflation is not without precedent. Figure 1 traces the movements in the Economist's Food Price Index – the oldest index of its kind available. It shows how the inflation-adjusted price of a basket of foodstuffs has changed over the last 165 years. In the twentieth century one can identify at least three agricultural commodity price cycles. The first cycle occurred from the turn of the twentieth century to the mid-1930s. The second cycle began in the mid-1930s and ended in the early 1970s. And the third cycle was experienced in the three decades leading up to the most recent escalation in the relative cost of food. From a quantitative standpoint each cycle appears to follow a consistent pattern: each lasts for 30 to 40 years; in each

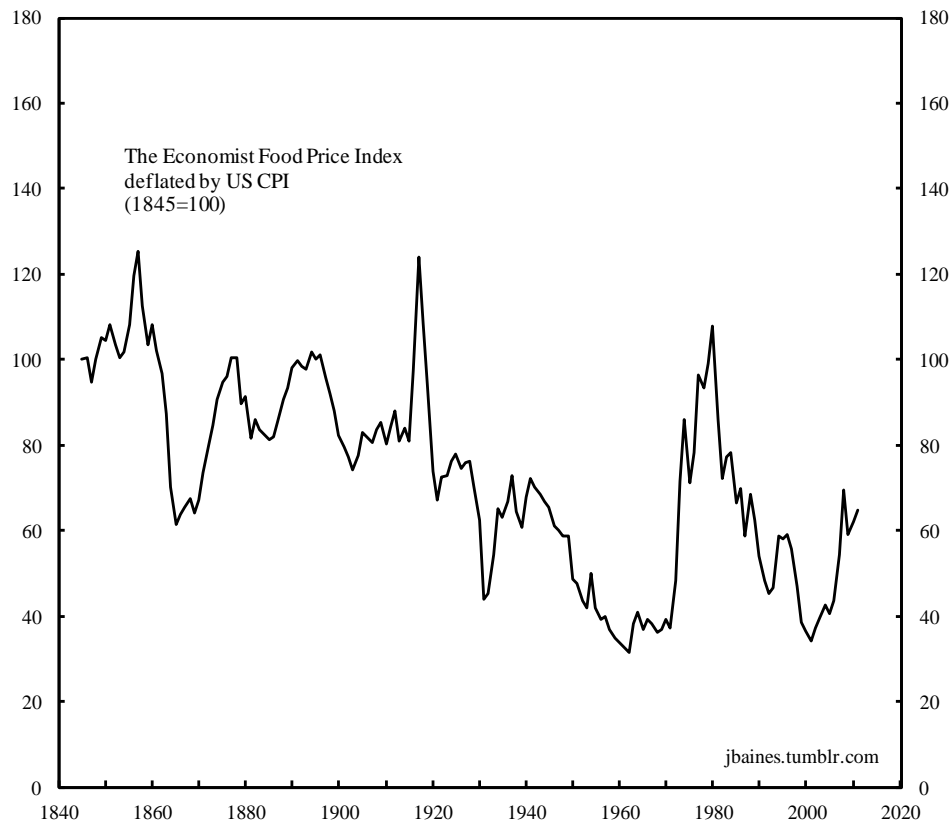


FIGURE 1. Inflation-adjusted food prices

Source: Food price index from the Economist Newspaper Ltd. CPI taken from Lawrence H. Officer, the Annual Consumer Price Index for the United States, 1774–2010, from Measuring Worth, 2010; <http://www.measuringworth.com/usapi/> [accessed 30 May 2012].

Notes: The Economist Food Price Index represents a basket of 14 food commodities that are weighted in terms of their relative values in world trade.

cycle there is a commodity price boom; and after each commodity price boom there is a period of ‘excess capacity’, usually lasting around two decades, that weighs down on food prices.

But despite their statistical regularity, these cyclical movements are not pre-determined by some objective mechanism. Instead, their depth, rhythm and trajectory are shaped by the dynamics of social power. Indeed, each successive agricultural commodity price cycle is characterised by a specific set of massive and oftentimes violent transformations in the organisation of society and nature. The bloodshed and repression that has followed the recent wave of democratic uprisings constitutes the latest and most blatant proof of this. And beyond these headline grabbing developments lie deep shifts in the configuration of corporate control over both the world food system and global capitalism as a whole. This paper seeks to make sense of these shifts during the denouement of the third agricultural commodity cycle and the period of food price inflation that has come in its wake. Drawing on the capital as power (CasP) perspective propounded by Jonathan Nitzan and Shimshon Bichler, the paper contends that the food price inflation of the last decade is a quantitative manifestation of an overall restructuring of corporate power within the political economy of food. This restructuring has been calamitous for much of humanity and very destabilising for many governments, but it has been extremely beneficial to some groups of firms.

A lot has already been written on corporate power in the global political economy of food. Three different forms of analysis are particularly prevalent: analysis that offers a broad historical overview of growing business control over the world food system (Goodman *et al.* 1987; Friedmann and McMichael 1989); analysis that proceeds through case-study examinations of individual firms (Morgan 1980; Whitmore 1999; Kneen 2002); and analysis that vacillates between these two perspectives (Shiva 2000; Patel 2007; Van der Ploeg 2010). Although the first two forms of analysis seem entirely different – with the former putting the contemporary political economy of food in historical context and the latter offering detailed insights into the intricacies of corporate control – what they have in common is that they both tend to neglect the conflicts between different groups of corporations. And while the third form of analysis wavers between the world-historic and the case-specific, intra-capitalist struggles remain blurred. The few studies that do seek to grapple with business conflicts within food supply chains (Burch and Lawrence 2005, 2007; Falkner 2009) do not offer any quantitative means of gauging the shifts in corporate control. Moreover, these analyses do little to connect corporate conflicts to the overall formation of food prices. Therefore, they do not have much to say about the wrenching food price inflation of the last decade beyond what is stated by conventional accounts of the food price crisis.

The analysis advanced here offers an alternative. It is premised on four principles derived from the CasP approach. Firstly, the power of a group of firms is reflected in the relative level of its pecuniary earnings. Secondly, food price changes are the aggregate appearance of redistributive shifts between groups and organisations operating in the world food system. Thirdly, these redistributive changes can be discerned by comparing the relative changes in different groups of firms’ pecuniary earnings to the relative changes in food prices. Fourthly, these quantitative phenomena are best understood with reference to a qualitative analysis of social struggles around the restructuring of

society and nature. Through this qualitative-quantitative method one can illuminate the key power dynamics within the political economy of food.

With these principles in mind I progressively disaggregate the profits of corporations operating in the world food system. The first section offers a breakdown of corporate earnings by sector. It questions the widespread notion within agrifood studies that supermarkets have gained mastery over food supply chains by showing that the sectoral profit share of food retailers and wholesalers has actually declined since the turn of the millennium. The second section outlines key aspects of the CasP approach and shifts the reader's attention from food sectors to clusters of dominant capital operating within food supply chains. I introduce new categories of analysis and I show that the pecuniary performance of both the major food retailers and major food manufacturers have virtually flat-lined since the mid-1990s. Such a finding raises further doubts about the supermarket mastery thesis.

Additionally, I show that the relative profits of the major grain traders and the major firms selling inputs to farmers have soared during the recent period of food price inflation. These findings make the dominant traders and agribusiness firms prime candidates for critical interrogation. Are they merely riding the wave of the latest food price cycle? Or have they been actively restructuring the world food system in ways that make food price shocks more probable? The third section investigates these questions. My main contention is that since the late 1990s the dominant grain traders have forged close linkages with major agribusinesses. These links have given rise to a power constellation that I call the Agro-Trader nexus. The nexus's main impact on the world food system since the early 2000s comes in the form of its facilitation and championing of the wasteful absorption of grain and oilseeds into the heavily subsidised first-generation biofuels sector. The soaring production of biofuels has contributed to a dramatic upswing in accumulation for the firms of the Agro-Trader nexus. However, the biofuels boom has been less beneficial for other firms operating in food supply chains and it has pushed millions of people into conditions of acute undernourishment.

Questioning supermarket mastery

The view that supermarkets have in recent decades rapidly increased their power so that they are now 'masters' of the world food system is shared by scholars from a whole range of theoretical positions within the IPE literature. The mastery thesis was first alluded to by Anthony Winson in 1993. And one year later it was given theoretical substantiation by the global value chains (GVC) approach (Gereffi and Korzeniewicz 1994). The GVC approach combines world systems theory's concern with elucidating spatial inequalities within global capitalism with analysis, derived from the work of Joseph Schumpeter and Joe S. Bain, of how actors can extract economic rent from the construction of 'barriers to entry'. The methodology of the GVC approach entails tracing the journey that commodities take as they are converted from raw material to finished consumer products. By mapping out commodity chains in this manner, GVC analysts hope to gauge different countries' relative capacities to capture value. The underlying premise of GVC analysis, as it was originally formulated, is that the distribution

of wealth within a chain is the outcome of the relative levels of the barriers to entry in each stage of production.

In order to discern differential national access to capturing value in each stage of production, GVC analysts seek to identify the key corporations operating supply chains. Gereffi's work was integral in this regard as he endeavoured to grapple with how 'lead firms' establish the standards and procedures with which other actors in the chain have to comply. From this work he constructed two ideal types of governance within commodities chains: 'producer-driven' and 'buyer-driven'. Producer-driven value chains are centred on those transnational corporations that control the key nodes of production. This kind of chain is characterised by a high level of vertical integration and its major barriers to entry lie in capital requirements and proprietary know-how. Buyer-driven value chains are governed by retailers and marketers that have outsourced their production capabilities to a range of smaller independent suppliers connected by intermediary firms through complex logistics networks. Their major barriers to entry are constituted by advertising, product design and electronic supply management systems (Gibbon 2001: 347; Gereffi and Christian 2010: 92–3).

Gereffi contended that producer-driven commodity chains were becoming eclipsed by buyer-driven commodity chains in the global economy. This change was, according to Gereffi, principally brought about by the 'retail revolution'. The retail revolution started out in the 1960s and 1970s when giant department stores such as Sears bought up independent retailers. And in the 1980s and 1990s the revolution unfolded in such a way that the department stores themselves were superseded by large-volume discount stores such as Wal-Mart and K-Mart (Gereffi 1994: 104–8). Despite the importance of these insights, in the early 2000s, the dual typology of buyer-driven and producer-driven value chains was slowly giving way to a more fine-grained, more technical and a less explicitly power-oriented analysis of intra-firm interaction that was anchored in transaction cost economics. This analysis paved the way for a switch in emphasis from 'governance as driving' to 'governance as coordination' (Gibbon, Bair and Ponte 2009).

Notwithstanding this switch, the idea that retailers were becoming the lead firms in the global economy was finding currency. David Burch and Geoffrey Lawrence were at the forefront of analysing the major supermarkets' dramatic rise in prominence within the world food system. Their main contention is that 'from the late 1960s control over the establishment and management of agrifood supply chains began to pass from the food manufacturers to the supermarkets' (2009: 275). This shift was driven by a number of factors, five of which they take as being especially important. First, the development of supermarket 'own brands', particularly within 'fresh/healthy' food niches, helped generate more revenue for the retailers and undermine the sales of the 'national brands' owned by the major food manufacturers. Second, as supermarkets become less reliant on the food manufacturers for the supply of established brands, they have become more able to enforce heavy slotting fees and other charges upon food manufacturers in return for the latter's continued access to supermarket shelf space. Third, global consolidation in the retail sector and the development of complex logistics systems have increased the ability of supermarkets to demand lower prices from food manufacturers, as food manufacturers are faced with fewer buyers and as food retailers

are able to source their products from a larger pool of suppliers. Fourth, food retailers' diversification into new areas such as petrol distribution, telecommunications and consumer finance has enabled them to consolidate their market power and expand economies of scale. And last, the development of 'strategic partnerships' with food suppliers, in Burch's and Lawrence's view, probably signals a tightening of retailer control over food supply chains (Burch and Lawrence 2007: 100–2). This tightening of control, they argue, is manifest in the fact that food retailers are now increasingly setting the quality and environmental standards for food manufacturers and fresh food producers; and in so doing, major supermarkets are becoming ever more able to determine the general health risks that consumers are exposed to (Burch and Lawrence 2007: 9). Due to the apparent importance of these factors, Burch and Lawrence have endorsed the notion first promulgated by Winson that supermarkets are the 'new masters of the food system' (2009: 268).

The major praiseworthy aspect of the supermarket mastery thesis is that it does not treat agrifood corporations as either case-specific or homogenous. This is important because, as argued above, in much contemporary scholarship, business interests are either viewed in aggregate terms or they are analysed at the micro-level; and from both theoretical standpoints, meso-level conflicts between different corporate groups are obscured. By drawing a distinction between food manufacturers and food retailers and by focussing on power relations within commodity chains, supermarket mastery theorists make an important step in devising an analysis which promises to offer a nuanced conception of the corporate restructuring of the world food system. However, this promise is only partially fulfilled. The shortcoming is primarily born out of the fact that few if any studies of supermarket power within the IPE literature have a quantitative method of actually gauging the power-shifts between different corporate groupings in the world food system. To illustrate the problems of neglecting this empirical dimension, Figure 2 plots the profit shares of the three major business segments within the political economy of food.

If the balance of power within food supply chains had indeed shifted decisively from manufacturers to retailers one would expect retailers to increase their share of overall corporate profits generated within the global food system. As the graph shows, the world's supermarkets' and food wholesalers' profit share trended upwards in the 1970s, 1980s and 1990s. So far so good: this trend coheres with the thesis. However, at the dawn of the new millennium the correspondence between the supermarket mastery narrative and the empirical reality of capitalist profits ends. Instead of superseding food processing and manufacturing companies, the food retailers' profit share hits its zenith in the year 2000 and then it declines. This decline is ironic as it is precisely during the downtrend that Burch and Lawrence profess their belief that 'the period when the manufacturing sector dominated the supply chain has passed, never to return' (2007: 119).

The profit-share data clearly casts the supermarket mastery thesis in a new light. More specifically, the data encourages an investigation into whether supermarkets' development of their own product lines and their diversification into new areas of business, rather than indicating a shift in the overall balance of power away from food

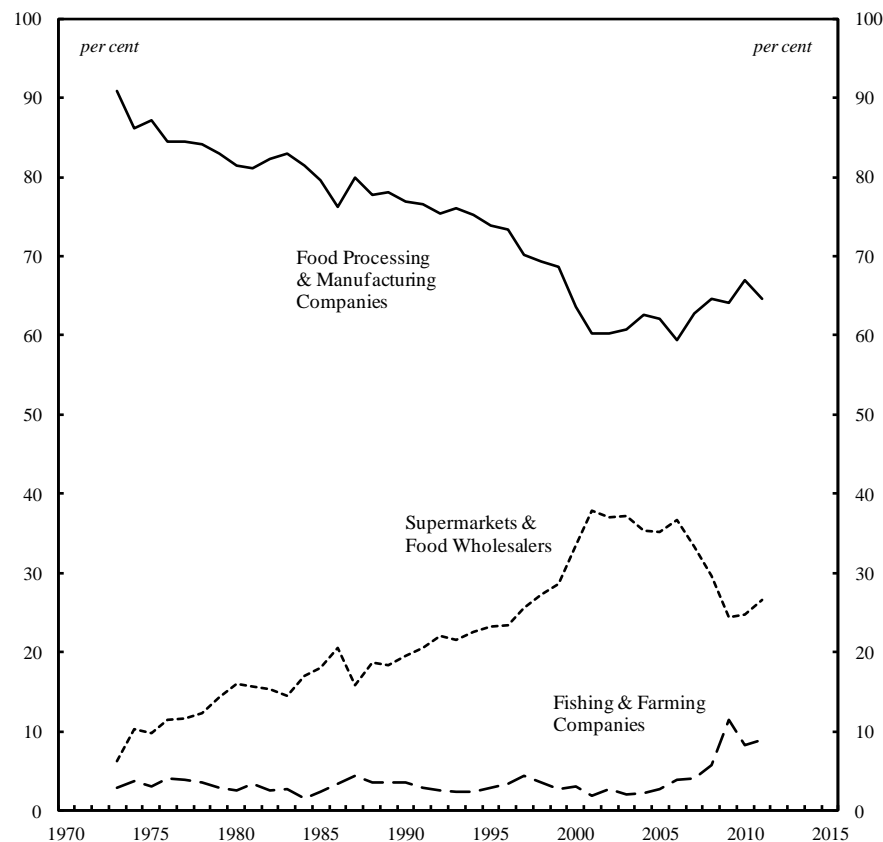


FIGURE 2. Profit share breakdown of the world food system

Source: Thomson Reuters Datastream. Series codes: food processing and manufacturing companies – FDPRDWD(MV), FDPRDWD(PE); supermarkets and food wholesalers – FDRETWD(MV), FDPRDWD(PE); fishing and farming companies – FMFSHWD(MV) & FMFSHWD(PE).

Notes: Profit data for each sub-sector calculated by dividing its total market value by its price-earnings ratio. Profit shares are computed as a percent of the aggregate profit of the three food sectors. The data cover listed companies only.

manufacturers, may be manifestations of increased competition for consumer loyalty in the retail sector itself. It may also suggest that the computerised logistical systems that seemed to benefit retailers so much from the 1970s to the 1990s, were offering diminishing pecuniary returns by the beginning of the twenty-first century. Finally, the data may indicate that supermarket mastery theorists exaggerate the degree to which food retailers have become empowered through the regulatory competencies that they have acquired over suppliers' production standards and their customers' consumption habits. There is no room to explore such hypotheses here, but suffice to say at this point, Figure 2 demonstrates the need to adopt quantitative methods of gauging power shifts within the political economy of food. Without these methods, researchers will find it hard to know how much weight they should give to various qualitative transformations in control over food supply chains. They are thus liable to arrive at wayward conclusions.

Mapping out corporate power in the world food system: a capital as power approach

The capital as power framework propounded by Jonathan Nitzan and Shimshon Bichler represents a potentially superior means of conceptualising the contemporary political economy of food for three main reasons. First, it puts business conflict and cooperation front and centre in the analysis of the accumulation process. Second, it links these various forms of conflict and cooperation to the formation of prices. And third, it encourages the researcher to critically theorise the connection between the quantitative changes of capital accumulation and qualitative transformations within the world food system. This section elaborates on these key aspects of the CasP framework and sketches out the framework's theoretical significance in relation to the global political economy of food.

Building in part on Thorstein Veblen's theory of business sabotage, Nitzan and Bichler argue that all profits stem from the institution of private ownership as it confers upon owners the power to exclude others from using their assets. Such a view gives the researcher a much more radical starting point than what is offered by GVC theory. Value chains analysis begins from the premise of perfect competition and then offers the concept of barriers to entry to account for those situations of 'market deviation' in which 'supernormal profits' are attained. But from a capital as power perspective, the idea that barriers to entry give rise to supernormal profits is unhelpful because it rests on the assumption that there exist 'normal profits' that can be secured without exclusion. For Nitzan and Bichler, all profits are exacted through exclusion because all profits depend on private ownership. Without private ownership there could be no restriction on the use of goods; and without restriction on the use of goods, goods could not be priced into commodities that yield pecuniary earnings. As such, it is private ownership in general that institutionalises exclusion, not 'barriers to entry'. The foundational exclusionism of private ownership is evidenced in the etymological roots of the word private: 'privatus' and 'privare' – Latin for 'restrict' and 'deprive' (Nitzan and Bichler 2009).

Moreover, the exclusionary underpinning of private ownership does not only enable business to limit the use of goods so as to generate pecuniary earnings; it also enables any one group of business to circumscribe the pecuniary earnings of other business groupings. Indeed, the pecuniary earnings claimed by one, are the pecuniary earnings that the others cannot have. Thus, by emphasising the centrality of exclusion within business, Nitzan and Bichler suggest that, at its core, the capitalist political economy is constituted by redistributive struggle. And by emphasising the integral role that restriction plays in generating pecuniary earnings, Nitzan and Bichler argue that this redistributive struggle within business undermines the efficient social reproduction of humanity at large (Nitzan and Bichler 2009).

Following on from these observations, in the CasP framework the concept of the market is turned on its head. Rather than being a pristine space that is distorted by power, through for instance the erection of barriers to entry, the market is itself a mechanism of power. It is the means through which corporate control over the restruc-

turing of social reproduction is expressed. This capacity to reorient human and non-human life for pecuniary gain is subject to constant resistance, transformation and negotiation and it is only because of the encompassing institution of the market that these socially heterogeneous dynamics can be articulated into universal quanta of dollars and cents. Indeed unlike pre-capitalist societies, in which exclusion is codified by custom and fealty in relatively stable structures of social control, exclusion within capitalism is continually being recreated through the buying and selling of ownership claims. To cite Nitzan and Bichler directly: ‘in capitalism *change* itself has become the key moment of order’ (2009: 153). Moreover, as capitalism is constituted by ongoing redistributive conflict within business, pecuniary magnitudes should be understood in relative rather than absolute terms. Thus, the continual process of recreating exclusion in the capitalist political economy is manifest in the qualitative realignments of corporate control, on the one hand; and it is given quantitative expression in changes in *relative* prices and *relative* profits, on the other (Nitzan and Bichler 2009).

In applying this method to the exploration of food retailer power, Figure 3 reproduces the time-series data of supermarkets’ and wholesalers’ changing profit share presented in Figure 2 and compares it with movements in the retail price of US consumer foods relative to the US price of foods at the intermediate stage of processing. The two time-series have a correlation coefficient of 0.89. This is remarkable when one considers that the price data is US-based only, but the profit share data pertains to supermarkets and food wholesalers all around the world. Moreover, the strength of the relationship is impressive given the fact that non-food items (such as clothing, fuel and financial services) constitute a large proportion of supermarkets’ revenues. The graph suggests that the ability of supermarkets to increase their profit share in the overall food sector depends to a large extent on the degree to which they can increase the price of foods faster, or reduce the price of foods more slowly, than firms exerting power further upstream in the supply chain.

Now, if we compare Figure 1 with Figure 3 a very interesting finding comes to the fore. Food retailers’ profit share and the relative price of retail foods fall at the turn of the millennium – the very same point at which food price inflation returns to world food markets. This observation underscores another key insight of the capital as power approach that is worth emphasising here: that ‘inflation is always and everywhere a redistributive phenomenon’ (Nitzan and Bichler 2009: 369). Or to put it in the terms of this research: food price inflation is the aggregate appearance of redistributive conflicts between various groups and organisations within food supply chains. These conflicts involve, but are not necessarily limited to, farmers, biotech companies, international trading houses, food and beverage corporations, retail firms and consumers. From these data we can tentatively conclude that on a sectoral level, the food price inflation that has occurred in the last decade has benefited agribusinesses, food processors and food manufacturers at the expense of food retailers. Undoubtedly, this observation requires more empirical scrutiny and corporate profits have to be broken down further. Nonetheless, it does pose serious questions to those who ascribe ‘mastery’ to supermarkets.

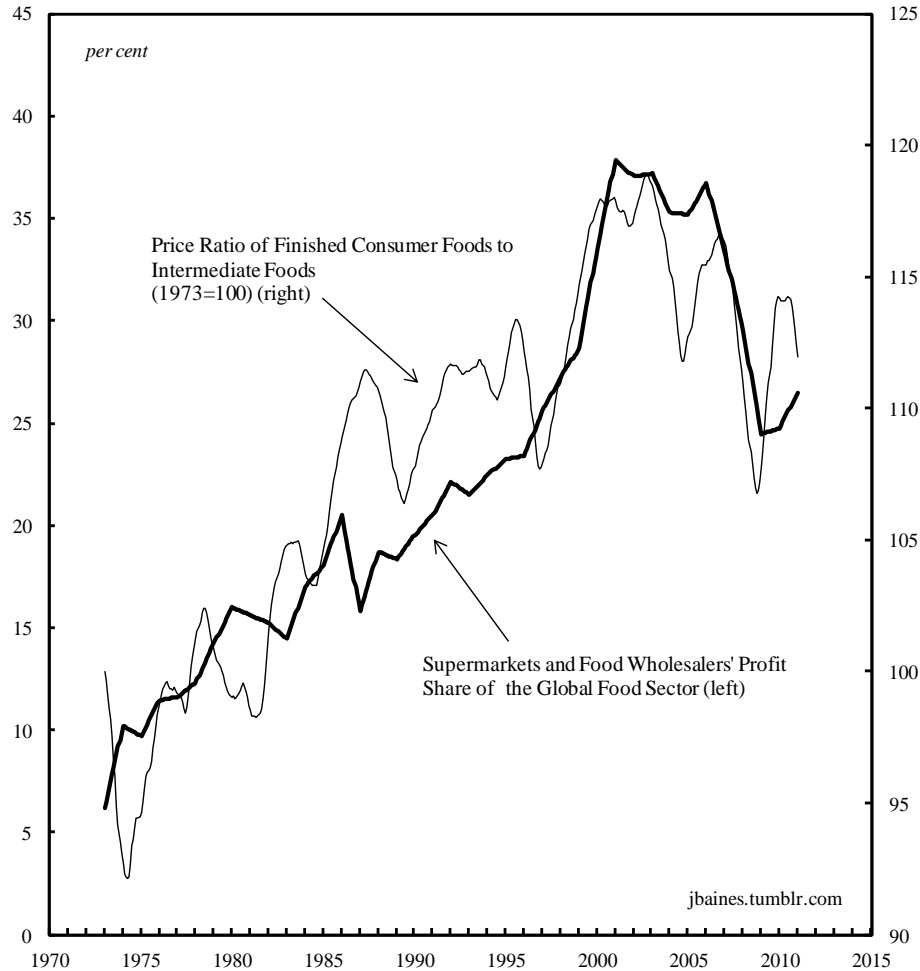


FIGURE 3. Relative food price movements and retailer profit share

Source: Profit share data from Thomson Reuters Datastream (see Notes to Figure 2). Finished consumer food price data and intermediate food price data from Global Insight. Series codes: 110157513 (US Producer Price Index Finished Consumer Foods) & 110157453 (US Producer Price Index Intermediate Foods and Feeds).

Notes: Price ratio data computed by dividing the monthly finished food price index by the intermediate food price index. The relative price data are presented as a one-year moving average.

So what do we disaggregate from here? The CasP approach encourages the researcher to study dominant capital with reference to differential profits. In the terms set out by Nitzan and Bichler, dominant capital is constituted by the leading firms that, in unison with various government organs, form the centre of the accumulation process. And differential profits are defined as the net earnings of a group of firms relative to some benchmarked average. The relativity of this measure stems from the fact that actual firms do not endeavour to maximise the absolute dollar level of their profits. In fact, the very notion of a profit maximum is conceptually indeterminate in any situation other than perfect monopoly or perfect competition. If we move into the real world of corporate finance, we find that firms continually measure their performance against a

pre-defined ‘average’. Political economy scholars should perhaps heed this ritual as it will give them a better understanding of the quantitative imaginary of business. More specifically, the benchmarking practice shows that different groups of corporations do not simply seek to retain their share of overall business profits; instead they continually strive to increase it. Therefore, through charting different corporate groups’ respective growth rates of differential profit one can illuminate the dynamic restructuring of dominant capital’s control over the organisation of human and non-human life (Nitzan and Bichler 2009).

With this in mind, I have constructed new proxies for the what I delineate as the four major clusters of dominant capital that mediate the journey that food takes from ‘farm to fork’. I call these clusters ‘the Agro-Core’, ‘the Trader-Core’, ‘the Food-Core’ and ‘the Retail-Core’. The Agro-Core is the 10 most profitable firms that control the production and marketing of inputs sold to farmers. The Food-Core is the top 10 most profitable firms that manufacture agricultural products into food products packaged within their multiple brand lines. The Retail-Core is the top 10 most profitable supermarkets that sell these foods to the consumer. And finally, the Trader-Core comprises the three most profitable firms engaged in the processing and trade of raw agricultural commodities. The Trader-Core proxy is limited to three constituent firms because of the paucity of available data on the major grain traders. The changes in the net profits of these four proxies relative to the net income of the Compustat 500 – the 500 largest firms by net income listed in the United States – are presented in Figure 4. The data are plotted on a logarithmic scale to facilitate comparison and to highlight the rates of change in differential profits. It is worth noting that although each proxy is an index and thus the underlying constituent firms change with each quarter, there have been a number of companies that have consistently made it into the top 10 for the Agro-Core, Food-Core and Retail-Core categories. These firms are listed in Table 1, along with the three firms that currently dominate the global agricultural commodities trade.¹

By disaggregating the profit data for the four major clusters of firms operating within the world food system, one can build upon the insights first derived from the sector-based profit share data presented in Figure 2. As one can see, the Retail-Core underwent a decade-long differential accumulation boom that began in the early 1980s and ended in the mid-1990s. Since then there have been modest cyclical upswings and downswings around a very slight secular uptrend in the Retail-Core’s differential profit. This indicates that the dominant supermarkets have experienced little more than pecuniary stagnation over the last two decades. Therefore, the chart raises further questions about the supermarket mastery thesis. While Figure 2 suggests that the food retailing sector reached its apogee within the world food system at the turn of the millennium, Figure 4 indicates that the retail revolution was already running out of steam by the mid-1990s.

Moreover, Figure 4 shows a very strong correlation between the differential profits of the Food-Core and the differential profits of the Retail-Core, especially from the early 1990s onwards. This suggests that the arguments about there being a shift in the balance of power from food manufacturers towards supermarkets are ill-conceived. The dominant food manufacturers’ pecuniary dynamics appear to move in tandem with, rather than counter to, the pecuniary dynamics of the major supermarkets. The view

that concordance outweighs conflict between major supermarkets and major food manufacturers is further supported by the findings of some specialist literature within consumer marketing research. This literature suggests that retailers' ability to use store brands to gain leverage over food manufacturers is circumscribed by the fact that it is the very same food manufacturers' 'national brands' that attract many consumers into their stores. The threat to demote the position of food manufacturers' branded products on store shelves or remove them altogether thus might ring hollow, as supermarkets are

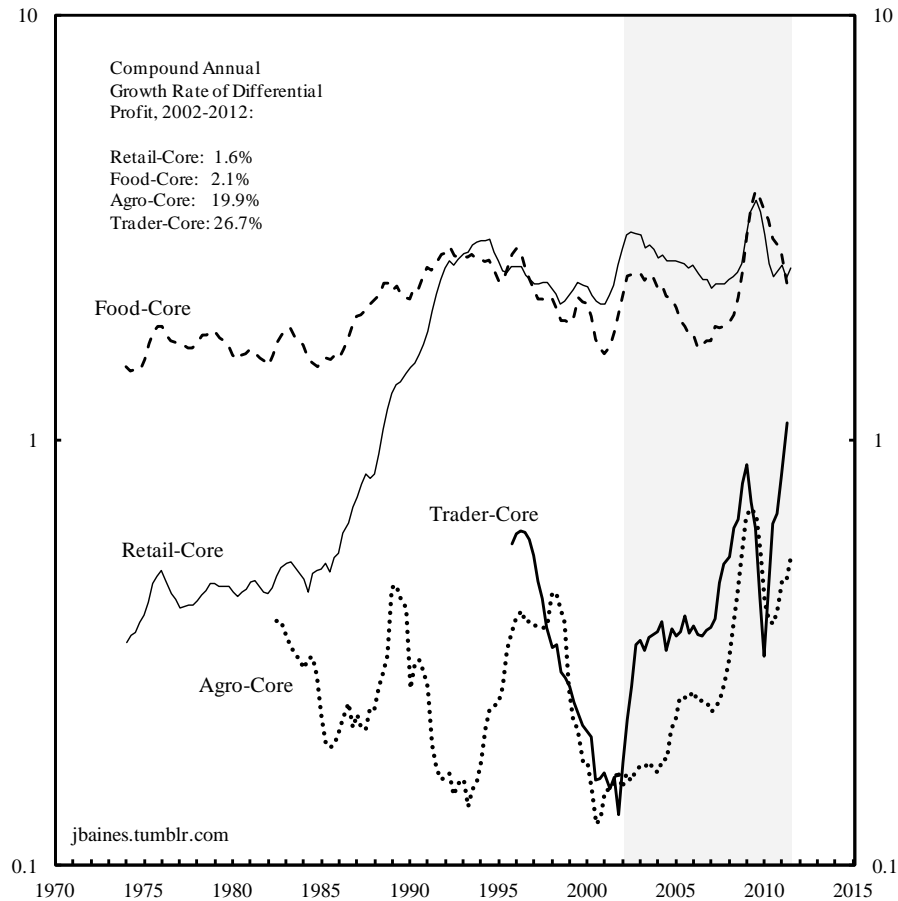


FIGURE 4. Differential profit of dominant capital groups in the world food system

Source: Agro-Core proxies: 'Crop Production' (NAICS 111- 111422), less subcategory 'Fruit and Tree Nut Farming' (NAICS 113-11399); 'Farm Machinery and Equipment Manufacturing' (NAICS 333111); and 'Pesticide, Fertilizer and Other Agricultural Chemical Manufacturing' (NAICS 3253 – 325320). Food-Core proxy: 'Food Manufacturing' dataset (NAICS 311 – 311999). Retail-Core Proxy: 'Grocery Stores' dataset (NAICS 4451 – 445120). Net income data for each firm from Compustat through WRDS (series code: NIQ). Where net income data was missing from Compustat it was obtained from Thompson Reuters Datastream, Forbes Magazine, Wall Street Journal, Financial Times, Business Source Premier and the Fortune Magazine.

Notes: For each quarter, the average net income per firm of the firms listed in the top 10 of each category (and of the top 3 for the Trader-Core) are divided by the average net income per firm of the Compustat 500 to yield differential profit data. Data are presented as one-year moving averages. For further details on computations see Note 2.

TABLE 1: Dominant Corporations in the World Food System

	<i>Company</i>	<i>Market Value</i>	<i>Comments</i>
<i>Agro-Core</i>	Monsanto	\$38.5bn	The world's largest biotech company. 90% of the U.S. soybean crop and 80% of the corn crop are grown with seeds containing genetic traits owned by the firm.
	Potash Corp.	\$35.5bn	Has the largest share of control over global fertilizer production. It is the world's largest producer of potash and the third largest producer of phosphate and nitrogen.
	Deere & Co.	\$31.9bn	The world's biggest manufacturer of farm machinery. Its main strengths lie in the large agricultural equipment associated with the soybean and corn sectors.
<i>Trader-Core</i>	Cargill	\$53.5bn	The largest private company in the world. Cemented its position as the world's most powerful grain trader when it bought the trading division of Continental in 1998.
	ADM	\$21.4bn	Has the largest share of control over the world ethanol industry. Historically just a agricultural commodities processor, it moved into trading in the 1970s.
	Bunge	\$9.0bn	Has the largest share of control over the flour milling and fertilizer industry in South America. It also has the world's largest share of control over soy processing.
<i>Food-Core</i>	Nestlé	\$196.4bn	The most powerful global food conglomerate. Moreover, in 2011 it was the world's most profitable company of any sector. Owns 29.5% stake in L'Oreal.
	Pepsi-Co	\$104.7bn	Famed for its eponymous soft drink, PepsiCo is much more than just a beverage corporation. It owns many food brands including Frito-Lay and Quaker.
	Kraft	\$69.4bn	Owner of numerous household names including Jacobs, Maxwell House and Philadelphia. In 2010 it acquired the Cadburys brand after a fractious takeover campaign.
<i>Retail-Core</i>	Wal-Mart	\$202.4bn	With 2.1 million workers it is as about as large as the People's Liberation Army of China in terms of employee numbers. The world's largest firm in terms of sales.
	Tesco	\$42.0bn	Dislodged Sainsbury's from the top spot in UK food retailing in the early 1990s. Tesco gets around 30 pence from every pound spent on groceries in Britain.
	Carrefour	\$12.5bn	Headquartered in France. It is the world's second largest retailer in terms of revenue and it has a strong presence in Europe, Asia and Latin America.

dependent on many of these brands for the sustenance of satisfactory levels of business traffic (Ailawadi 2001: 313). Moreover, slotting fees and the exacting quality standards imposed by supermarkets may actually be supported by large food conglomerates as they know that smaller suppliers cannot bear the weight of hefty expenses and stringent regulations (Hendrickson *et al.* 2001). Lastly, this exclusionary logic may also apply to the 'strategic partnerships' that have proliferated between food retailers and food manufacturers in recent years. Rather than increasing the power of supermarkets over food manufacturers in general, such alliances may be consonant with the pecuniary interests of dominant food manufacturers: ensuring both the exclusion of smaller suppliers and a concomitant increase in the predictability of earnings.

Interestingly, just as the differential accumulation dynamics of major supermarkets and major food conglomerates generally move in sync, the Agro-Core's and Trader-Core's differential accumulation trajectories also follow a similar course. Moreover, in pecuniary terms the Agro-Core and Trader-Core tend to move to a completely different rhythm to the Food-Core and Retail-Core pairing. In the early 1980s the Agro-Core differentially decumulates when the Food-Core and Retail-Core differentially accumulate and for much of the 1990s the Agro-Core also moves in an opposite direction to the Food-Core and Retail-Core. This negative correlation breaks down in the late 1990s when all four major clusters of dominant firms within the world food system experience a decline in earnings relative to dominant capital in general. However, the inverse relationship is restored again from 2002 to 2006 when agricultural commodity price inflation sets in.

During the 2007–8 food price hike the Agro-Core and Trader-Core experienced a differential accumulation boom. The upswing in the differential profits of the Food-Core and Retail-Core lags behind both in temporal terms and in terms of sheer magnitude. Moreover, while the revival in the Food-Core's differential profits is quite significant, the Retail-Core's rebound is rather modest. And in the most recent food price hike no pecuniary upturn for the Food-Core and Retail-Core seems evident. In fact, their differential earnings continue to decline. More generally, one can see that in the whole period of severe food price inflation (shaded in grey) the Agro-Core and Trader-Core differentially accumulate much more rapidly and for a much longer period of time. Indeed, as shown by the statistics presented in Figure 4, from 2002 to 2012 the major food retailers and manufacturers have only been increasing their differential profits relative to dominant capital by a paltry two per cent a year; while the Agro-Core and the Trader-Core have increased their differential profits annually by an astounding 20 per cent and 27 per cent, respectively. These observations suggest that in periods of rapid agricultural commodity price inflation, the firms that are in closer proximity to the end-consumers in food supply chains find it hardest to differentially accumulate.

Taken as a whole, Figure 4 indicates that those scholars who focus on the balance of power between food retailers and food manufacturers miss out on what perhaps is a much more important dynamic within the contemporary political economy of food: the accumulation boom of the Agro-Core and Trader-Core over the last decade. Although it is true that the dollar profit levels of the dominant food manufacturers and food retailers are far greater than those of the dominant grain traders and the major firms selling agricultural inputs, the growth rate of the differential profits of the Food-Core and

Retail-Core since the turn of the millennium has been comparatively modest. In short, the agribusiness firms and the grain traders are in the ascendant, not the food retailers. Thus, in order to more adequately comprehend the restructuring of corporate power over the world food system since the turn of the millennium, we must focus on the pecuniary strategies of the agribusiness firms and grain traders. Given this fact, the last section of this paper turns the reader's attention from the major food retailers and food manufacturers to the Agro-Core and Trader-Core. It will be suggested that key firms within both clusters forged important cross-linkages with one another towards the end of the 1990s. These linkages gave rise to what I term an Agro-Trader power nexus. Rather than passively cashing in on the upswing in agricultural commodity prices, the firms within this nexus have been actively working to restructure the world food system in their favour, and in ways that make violent inflationary shifts much more likely.

The emergence of the Agro-Trader nexus and the restructuring of the world food system

The power trajectory of the Trader-Core

In the nineteenth century the major grain traders were all shadowy organisations that were privately held by a small number of highly uncommunicative clans. Indeed, when Dan Morgan wrote his brilliant expose' of the 'merchants of grain' in 1979 the five companies that dominated the world's trade in grain (Andre', Bunge, Cargill, Continental and Louis Dreyfus) were owned by just seven families (1979: 19). They all sold exactly the same commodities and had no distinct business advantages such as the possession of patents or proprietary technology (Lindell 1982: 240). Moreover, the grain trade was a relatively low overhead business in which large profits could be made from relatively small investments. As such the major grain merchants' main assets were not their products or their holdings but their personal connections and their unsurpassed knowledge of changes in grain markets (Morgan 1979: 115). In this sense, the exclusionary capacity of the trading houses, and therefore their ability to profit, was not guaranteed by the law through formal claims of ownership; instead, their capacity to exclude was customary in nature; it was based on the cultivation of an intense culture of secrecy (etymology: *sēcrētus*, Latin for 'separated', 'hidden').

The grain merchants' stealthy expansion of control over food supply chains had taken them very far. At the beginning of the third agricultural commodity cycle in the early 1970s, the six largest trading houses controlled between 85 per cent and 90 per cent of US grain exports (Committee on Foreign Relations 1977: 72). However, as Figure 5 shows, the grain merchants did not just consolidate their control over trading. They also extended their power over the processing of agricultural commodities. The chart, which depicts firm concentration ratios, focuses on the flour milling, soybean crushing and wet corn milling sectors because they represent the main foci points of the modern food system. Flour, as the main ingredient for bread, has become in many cultures synonymous with life sustenance itself, as diverse and nutritionally rich diets

across the world have been homogenised along the lines of wheat-dependency. And soybeans and corn have become key commodities because they provide the raw material for many of the industrialised inputs which have become omnipresent in modern food supply chains such as high fructose corn syrup; xanthan gum; corn starch; soy lecithin; glycine; maltodextrin; citric acid; corn oil; diglycerides; dextrose and glucose, along with animal feeds such as corn meal and soybean oil cake. By replicating the natural properties of traditional ingredients, these ‘fabricated foods’ represent a source of ‘value-added’ for corporations involved in processing. They are more durable and transportable than traditional rural products and, as many of these inputs are interchangeable, they enhance processors’ power over mono-cropping farmers. The measure presented in the chart, commonly called the four-firm concentration ratio (or CR4 for short), is used by economists to assess the extent to which the four largest firms in a given sector exert oligopolistic control. The chart also shows the changing shares of control wielded by the three major Trader-Core firms: Archer Daniels Midland (ADM), Bunge and Cargill. As one can see, these three firms’ control over each sector has increased dramatically over the last three decades.

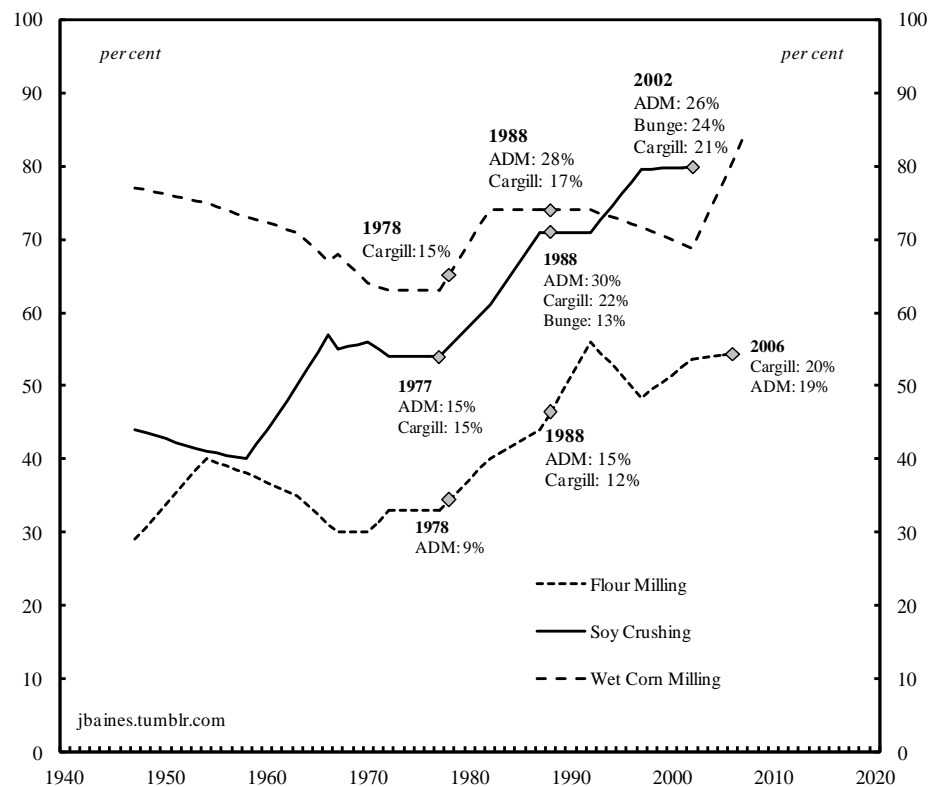


FIGURE 5. Four-firm concentration ratio in raw agricultural commodities processing

Source: CR4 data from US Census Bureau (available from: <http://www.census.gov/econ/concentration.html> [accessed 30 May 2012]). Individual firm data for 1977, 1978 and 1988 from Marion and Kim (1991). Firm data for 2002 and 2006 from Hendrickson and Heffernan (2007).

Notes: The four-firm concentration ratio (CR4) is the percentage of the total value of shipments in a sector accounted for by the four largest companies.

The Trader-Core's strategy of extending their pecuniary ambit over domestic processing made a good deal of sense from a business standpoint. Amidst a slump in world grain exports after the boom of the 1970s, the devalued agricultural commodities that they were trying to sell internationally could be absorbed into their new processing divisions. But the traders' expansion into processing was also constitutive of dietary transformations in the period. Some of the main facets of this transformation are depicted in Figure 6. One of the most striking aspects of the chart is its depiction of the rapid rise in high fructose corn syrup (HFCS) consumption in the last three decades of the twentieth century. The upswing in HFCS consumption was underwritten by the Reagan administration's imposition of strict import quotas on sugar in 1981. This policy was in part born out of intense lobbying by grain processing firms such as Archer Daniels Midland via ostensibly farmer-based interest groups such as the American Sugar Alliance. It was also brought about by pay-offs in the form of generous contributions to the electoral campaigns of both Republicans and Democrats (a practice known as 'tithing' in ADM's parlance). Once the quota was imposed the domestic

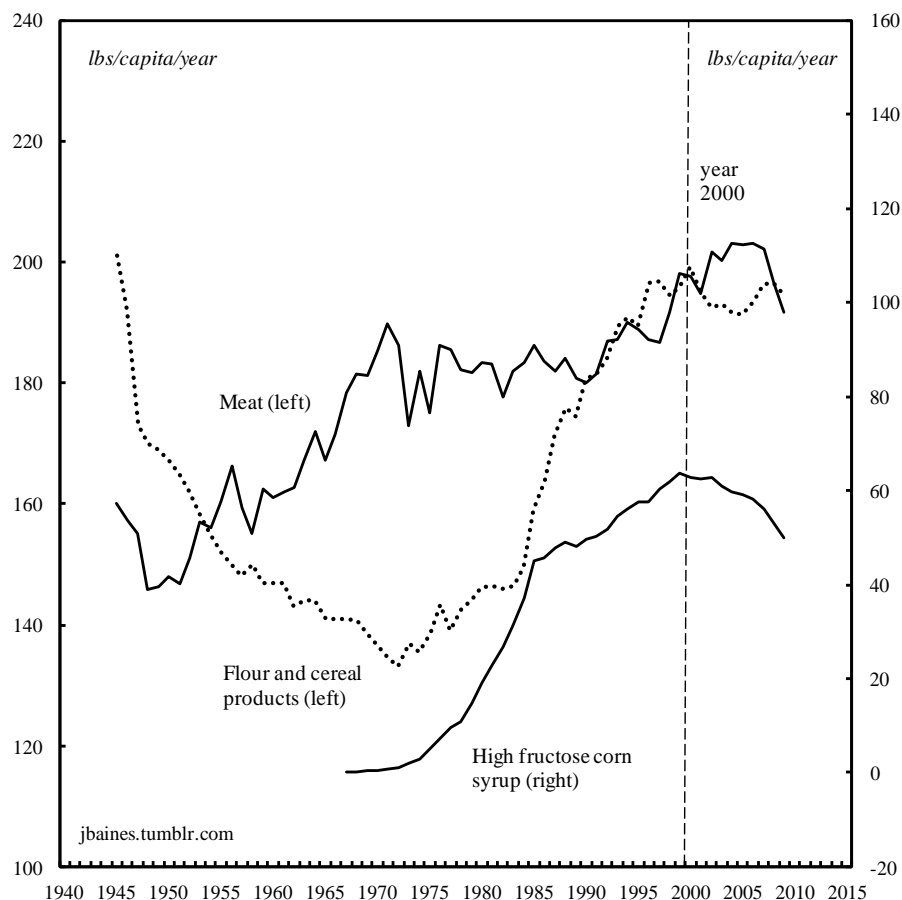


FIGURE 6. Transformations in the American diet, 1945–2010

Source: <http://ers.usda.gov/data/foodconsumption/FoodAvailspreadsheets.htm> [accessed 25 June 2012].

price of sugar soared and major companies such as Pepsi and Coca Cola switched from using cane sugar as their primary sweetener to the HFCS produced by the major grain processors' very own corn wet mills. Due largely to the beverage industry that Coca Cola and Pepsi dominate, HFCS consumption increased so much that by the turn of the millennium the average American was consuming almost as much of the stuff as ordinary sugar (Bovard 1995; Patel 2007).

More generally, the increased American consumption of grain-based foods, as depicted in Figure 6, was driven by the 'fast food revolution'. From being rather peripheral players in the food service industry in the 1960s, fast food restaurants have become ubiquitous. By the turn of the millennium, it was estimated that on any given day one in three American children and one in four American adults will visit a fast food outlet (Schlosser 2001: 3; Pollan 2006: 111). The development of the fast food supply chain has wrought violence upon communities across the world, precipitating deforestation and peasant displacement on one end and coronary heart failure and diabetes on the other. However, for the grain merchants the changes brought about by the fast food revolution were most welcome. More and more consumers munched through nuggets made from an amalgam of corn-fed chickens, modified corn starch and soy lecithin; more and more consumers chomped on burgers comprising wheat-based buns and beef patties originating from soy-fed cows reconstituted with yellow corn flour and partially hydrogenated soybean oil; and more and more consumers slurped on corn-sweetened beverages to wash this junk down. And as the fast food revolution rolled out to the rest of the world and as people increasingly turned towards meat-heavy diets, the major grain traders felt there was good cause to be optimistic. The enthusiasm for the meat sector as an absorbent for grain 'excess capacity' was well articulated by the CEO of Archer Daniels Midland in the 1980s:

Think of chickens with their little mouths . . . Nothing affects them. They're biting, biting, biting . . . Little pigs biting, biting. More every single day. It's a dog-eat-dog competitive global market, but it isn't true that exports aren't going to come back. Chickens are growing damn near 10% each year. (cited in Stavro 1985: 40)

However, the Asian Financial Crisis of 1997–8 depressed global grain consumption. Up until that point East Asia represented a key regional market for the Trader-Core. But in the wake of the crisis, imports of foodstuffs processed and transported by the major grain merchants fell precipitously. To compound problems for the Trader-Core, there was a slowdown in the expansion of major fast food chains and low carbohydrate diets became increasingly popular. And in the beverage sector, corn-sweetened soft drinks were falling out of favour amidst the increased popularity of bottled water, activism against soft drink vending machines across schools and universities, the end of 'supersizing' by some fast food chains and well-publicised research that suggested corn syrup was a key cause of obesity (Meyer 2005: 48). The key dietary changes are depicted in Figure 6. The chart shows that by the early 2000s per capita flour and cereal consumption tapered off and HFCS intake dipped. And a few years later even meat consumption was falling. The decline of the differential profits of the Trader-Core dur-

ing the late 1990s was in large part brought about by this relative decrease in the consumption of grain-based products. The problems were most pronounced for their grain processing operations in the US as they began to lose the battle for American ‘stomach share’. And that battle is important, since even Cargill, the most globalised agricultural commodities trader, still generates 37 per cent of its revenues from sales in North America (Cargill 2011). As a result of these changes in international grain markets and American consumption trends, problems of ‘excess capacity’ within the storage and processing of corn and wheat had returned, and by the late 1990s the relative cost of primary agricultural commodities had reached its lowest level for three decades (see Figure 1).

At the dawn of the third millennium, one market analyst remarked that ‘[a]nything to do with food – growing, processing, packaging, marketing, retailing – attracts all the investor interest of a dead skunk at a tea party’ (Meyer 2000: 20). But as one may recall from Figure 4, some clusters of firms within the world food system were doing worse than others. While many investors turned their noses up at major supermarkets and food manufacturers, from a pecuniary standpoint it was the performance of the Trader-Core and Agro-Core firms that stank the most. The major causes for the pecuniary downturn of the Trader-Core have been detailed in this section and it is worth noting that these factors also negatively impacted the Agro-Core. The easing consumption of grain-based foods precipitated a slump in commercial farming in many parts of the world and this slump put downward pressure on the volume of the sales of the agricultural inputs that the Agro-Core controlled. However, the Agro-Core’s pecuniary performance was not simply shaped by the balance of production and consumption. Instead, the rapid differential decumulation of the dominant agribusiness firms in the late 1990s has to be contextualised in relation to the ‘troubled birth’ of the biotechnology sector within agriculture (Falkner 2009). This troubled birth did not affect all Agro-Core firms. But agribusiness companies that were delving in the ‘life sciences’, such as Monsanto, had a strong interest in ensuring the successful delivery of biotechnology from its prolonged gestation in bioengineering laboratories to true genesis in world agriculture.

The Agro-Core and the contested emergence of agro-biotechnology

In principle, biotechnology held a lot of promise for corporations selling inputs to farmers: by patenting various bioengineered seeds, agribusiness could intensify the commodification of the agricultural process. Moreover, from the perspective of chemical companies, biotechnology held the key to increasing farmer dependency on the agrochemicals they sold as most of the early genetically modified crops were designed for herbicide tolerance. The engineering of this genetic trait was important for firms such as Monsanto because their patent on their Roundup product – a herbicide that kills plants indiscriminately and that contributed to around one-fifth of the company’s revenues – was going to expire in 2000 (Vellema 2004: 46). By inserting a gene into plants that made them tolerant to the blanket application of the herbicide, Monsanto could maintain its large market share in agrochemicals and sell their Roundup herbicide and

Roundup Ready seed as part of a comprehensive package of inputs to farmers. But chemical firms such as Monsanto knew that in order to seize the opportunities that the biotechnology industry offered they had to influence government policy on genetically modified (GM) crops. They achieved this end through intense lobbying and also through the 'revolving door' that facilitated the two-way movement of staff between the upper echelons of agribusiness and the apex of the US government's regulatory apparatus. This regulatory incest between the 'regulators' and the 'regulated' made the US's policymaking environment very propitious for the rapid spread of transgenic crop production (Palaez and Schmidt 2004: 233–5).

However, the chemical companies perhaps underestimated the degree to which they needed to convince people beyond the halls of the US government about GM plants. Some agronomists found that the yields of transgenic crops were below that of non-engineered varieties. Such findings undermined the credibility of those agribusinesses that boldly proclaimed that genetic modification would increase agricultural productivity. The controversy of GM food was cast into sharper relief after Monsanto first touted its planned use of 'terminator technology' – a modification that was to take away plants' germinative capacity and thus guarantee the company's proprietary rights over living organisms. NGOs such as Greenpeace and farmers' organisations such as the one-and-a-half-million-strong Brazilian Landless Workers' Movement protested vociferously against genetic modification in the wake of such revelations. The terminator episode was a public relations disaster for Monsanto and in 1999 the company announced that it was discarding plans to render its seeds sterile (Vellema 2004: 50–2). There was also resistance to agro-bioengineering from consumers. People in Europe were particularly uneasy about GM 'Frankenstein' foods as they had just gone through the jitters of the BSE crisis. To compound problems for the agrobiotech companies, major food manufacturers appeared to be exploiting widespread consumer scepticism about bioengineering so as to present themselves as the true guardians of human nourishment. Nestlé and Unilever insisted that they would not 'take a bullet for GMOs', to cite the words of one Nestlé representative, and they publicly declared they would refrain from using bioengineered foods in the products that they sold (Deutsche Bank 1999). Similarly, many food retailers were unsympathetic to agro-biotechnology. Indeed, major European supermarkets adopted a labelling policy for GM foods that went far beyond anything stipulated by EU legislation (Falkner 2009: 235–8).

As a result of these counter-currents, biotech and chemical firms had difficulty encouraging the spread of transgenic crop production beyond the United States and a small number of other countries such as Argentina and Canada. Moreover, many governing authorities within key import markets, such as the EU, Japan and Korea, followed the major food conglomerates and retailers in establishing strict import and labelling regulations. As the major biotech firms became increasingly aware of the rising public hostility towards transgenic crops, they sought to insulate their pharmaceutical divisions from the contestation over agricultural biotechnology. In 1999, Novartis and AstraZeneca, the third and fourth largest 'life sciences' firms at that time, decided to spin off their respective agribusiness and agrochemical divisions and merge them to form Syngenta. Similarly, in early 2000 Monsanto and Pharmacia & Upjohn completed a merger of their pharmaceutical operations and created a separate company focused on

the application of biotechnology to agriculture, under the name of Monsanto. It was thus in this context of widespread public disquiet over agro-biotechnology that the Agro-Core crystallised into a distinct corporate cluster. However, the GM controversy did not abate. A few years after the new Monsanto was formed, the company sought to introduce transgenic wheat to the US; but because of farmer resistance towards the idea, the plan was scrapped. Hence, even in the heartland of agrobiotechnology, there seemed to be severe limits placed on the Agro-Core firms' capacity to use the biotech industry for their own pecuniary ends (Falkner 2009).

At the turn of the millennium there were discernible similarities between the Agro-Core and the Trader-Core. As we can see in Figure 4, both clusters of firms were experiencing rapid differential decumulation amidst widespread scepticism about GM food, the declining popularity of grain-based products and a slump in global agricultural markets. And perhaps partly in response to those adverse developments, both clusters were undergoing rapid consolidation. The world's largest grain firm, Cargill, bought up the entire trading division of the world's second largest grain trader, Continental, in 1998. The major food processor-cum-trader Archer Daniels Midland bought up important assets of Louis Dreyfus, Glencore and also of André when it went bankrupt in 2000. And Bunge became the world's leading soybean trader after it purchased Europe's oilseed giant Cereol in 2002 (Milling & Baking News 2002). According to one estimate, by the early 2000s ADM, Bunge and Cargill, taken together, controlled between 75 per cent and 90 per cent of the entire world's trade in grain (Holt-Giménez and Patel 2009: 18). Consolidation was just as dramatic within the Agro-Core. After DuPont bought up Pioneer Hi-Bred in 1999 it gained the world's largest share of control over commercialised seed. The seed sector got even more consolidated in 2002 when DuPont and Monsanto signed a deal to swap their key patented technologies and drop all outstanding lawsuits they had levelled against one another (ETC 2003: 7). The US seed business has subsequently been dominated by a Monsanto-DuPont duopoly. It was in this context of pecuniary retrenchment and corporate consolidation that a new Agro-Trader nexus developed between the Agro-Core and the Trader-Core. The remainder of this paper outlines the institutional makeup of this power constellation and explores the social ramifications of its rise to prominence.

The formation of the Agro-Trader nexus and the biofuels boom

The links between the Agro-Core and Trader-Core were primarily constructed through joint ventures – a means of corporate amalgamation which offered almost all of the advantages of mergers but without the impediments of antitrust law (ETC 2008: 13). Perhaps the most important joint venture that ADM embarked upon was with Countrymark – a major eastern Corn Belt cooperative. Countrymark was aligned to Novartis – the third largest seed company after Monsanto and DuPont in the late 1990s (Heffernan 1999: 8). However, the two other main grain traders were ensconcing themselves much more deeply than ADM within the Agro-Core. In 1998, Cargill hooked up with Monsanto and they embarked on a joint venture called 'Renessen' (Milling & Baking News 1998: 11). The venture indicated significant consolidation within the global food sys-

tem as it brought together the world's largest grain trader with what would soon become the world's most powerful agro-biotech firm. Similarly, in 2003 Bunge married some of its operations with DuPont, giving birth to the 'Solae' project (Milling & Baking News 2003: 10). In this venture, Bunge agreed to sell DuPont's seeds and agrochemicals to farmers who were contracted to produce soybeans for Bunge's silos. Moreover, after a series of acquisitions in the 1990s, Bunge commanded the largest share of control over the fertiliser industry in South America (Howie 2000: 3). And in 2004 Cargill acquired a majority stake in Mosaic – the world's second largest fertiliser company. Taken as a whole, these developments were premised on the establishment of proprietary claims over agrochemicals and plant life. Cargill's CEO Gregory Page summarised his company's re-orientation in eerie terms: '[i]n the broadest sense, Cargill is engaged in the commercialisation of photosynthesis. That is at the root of what we do' (Page 2012). By becoming more integrated into the Agro-Core, the Trader-Core were instituting new areas of exclusion and thus new sources of potential profits that supplemented the traditional norms of secrecy that had for a long time characterised their merchandising divisions. The Agro-Trader nexus emerged as a result of these developments. Figure 7 outlines the nexus's key companies.

The formation of this power constellation put the Agro-Core and Trader-Core in a very strong position to benefit from the emergence of a new agricultural commodities cycle in the early 2000s. However, it is important to note that the Agro-Trader nexus was not merely riding the wave of rising relative prices of agricultural commodities. Instead, it actively contributed to agricultural commodity price inflation. Some scholars have examined this active contribution partly through the optic of 'financialisation'. For example, a recent study by Sophia Murphy, David Burch and Jennifer Clapp details how ADM, Bunge and Cargill along with Louis Dreyfus have expanded their financial services divisions in the last decade. The authors suggest that this expansion has facilitated the 'speculative activity' of groups such as hedge funds and pension funds in the trading of agricultural commodity futures, which in turn has exacerbated food price inflation (Murphy *et al.* 2012).

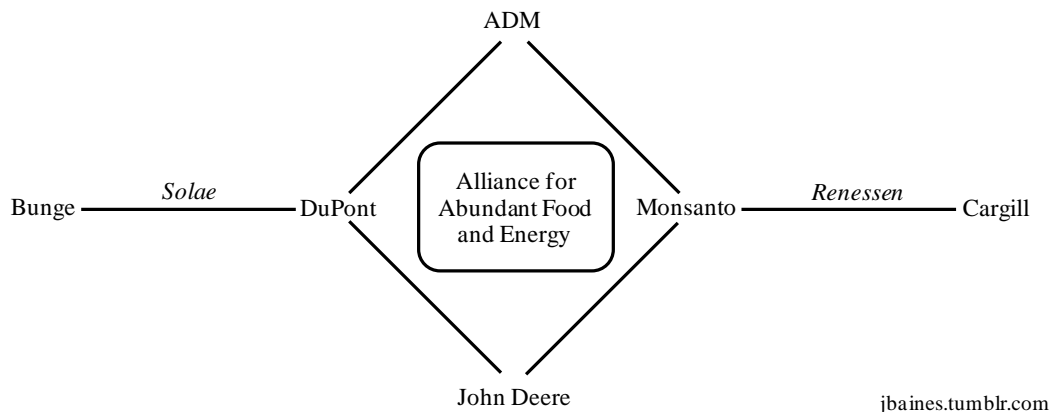


FIGURE 7. The Agro-Trader nexus

The analysis has a lot to recommend it, not least because it describes in meticulous fashion the involvement of the Trader-Core firms in the contested re-regulation of the commodities futures market. However, given the lack of quantitative data on the major grain traders' activity in agricultural commodity futures, and given the fact that most scholarly analyses appear to be inconclusive or even sceptical in regard to whether 'speculation' impacts food prices even in the short-term (see Headey and Fan 2011; Sanders and Irwin 2011; Östensson 2012; but see also Lagi *et al.*, 2011), I prefer to advance an alternative explanation that hinges on the concept of institutionalised waste. This concept was introduced by Veblen and developed by Paul Baran and Paul Sweezy to denote the 'formula[e] for maintaining scarcity in the midst of potential plenty' (Baran and Sweezy 1966: 337). The institutionalised wastage is partially achieved through the diversion of grain into meat production.³ But this is nothing new. In actual fact, world feed grain use has fallen from 41 per cent of total world grain consumption in 1972 to 34 per cent of the total in 2010 (Earth Policy Institute 2012). It was primarily the rapid development of the first-generation biofuels sector in the 2000s that catalysed the inflationary shifts that have recently reverberated throughout the world food system. The Agro-Trader nexus was at the forefront of this biofuels boom. Indeed, the Renessen venture between Cargill and Monsanto sought to engineer and patent varieties of corn with high levels of starch, so that the crop can be more easily processed into ethanol (GRAIN 2007: 19) and Bunge's and DuPont's Solae venture has also come up with inbred and bioengineered varieties of corn and soybeans specially designed for the combustion engine rather than the human stomach (Milling & Baking News 2006: 20). Although ADM has not been involved in any comparable ventures with the agro-biotech giants, it has worked unremittingly to create a policy environment within which the wasteful absorption of grain in the biofuels sector can be achieved. As one Washington analyst put it:

Perhaps no commodity in American history has depended more on government support for its viability than ethanol. And perhaps no other company has done as much to orchestrate Washington's current support for the fuel than ADM. (Palmer 2006: 1)

Indeed, ever since corn ethanol was first developed in the 1970s, ADM has been the major player within the US biofuels sector and it has truculently argued for extensive government support for biofuels on the dubious grounds of environmental sustainability and energy security. And the company oftentimes got its own way. The aforementioned 1981 reforms to America's Sugar Program is a case in point. By instituting a barrier to sugar imports, the Reagan administration protected the US's embryonic corn ethanol industry from the importation of an alternative, and indeed superior, raw material for ethanol production. America's corn ethanol industry, over which ADM had a 75 per cent share of control, was also protected by the imposition of tariffs in 1980 on the much more energy efficient sugar ethanol produced in Brazil. But despite the extensive government support, US biofuels production increased only very slowly in the 1980s and 1990s (Weiss 1990; Bovard 1995).

However, in the 2000s the American biofuels sector experienced a dramatic growth spurt. The ‘War on Terror’ and the concomitant rapid rise in oil price inflation (see Nitzan and Bichler 2004), made the arguments concerning biofuel-based energy security appear more credible. In 2005 the Energy Policy Act was passed. The bill mandated the blending of 7.5 billion gallons of ethanol into America’s gasoline supply by 2012. In 2007 the biofuels sector was further bolstered by the US Energy Independence and Security Act. This piece of legislation increased government subsidies for ethanol production and mandated that 36 billion gallons of biofuels be added to gasoline by 2022. And in 2008, amidst increasing concern about the role of biofuels in contributing to food price inflation, ADM formed the ‘Alliance for Abundant Food and Energy’ along with the major companies of the Agro-Core – Monsanto, DuPont and John Deere – to defend the existing government subsidies for the biofuels sector (Cameron 2008). As indicated by Figure 7, these four firms represent the axial organisations of the Agro-Trader nexus.

The nexus has worked in unison with key government organs, such as the US Department of Energy and the US Department of Agriculture, to institutionalise an unprecedented increase in waste in the world food system. The conversion of corn – US’s primary crop for biofuels feedstocks – into ethanol represents the most egregious manifestation of this wastage. Despite being pitched as a ‘green alternative’, when all the energy required to produce corn and then process it into ethanol is considered (such as the diesel to power tractors, the natural gas to make nitrogen fertiliser and the coal to run ethanol production plants), the ostensible environmental benefits of ethanol production look very dubious indeed. According to the most optimistic studies, 1.3 units of energy are produced for each unit of energy used in corn-ethanol production in the US. More realistic calculations suggest that the average energy yield is a measly 1.01 per 1 unit of energy input. This ratio compares very poorly to gasoline production, which on average, yields 5 units of energy from 1 unit of energy input (Albino et al. 2012: 3). In fact, even the most energy efficient biofuel – ethanol derived from cane sugar – has less than half of the net energy yield of gasoline (Murphy 2010: 276). ADM’s oft-repeated arguments about biofuels increasing the US’s energy independence are also specious. It was estimated in 2005 that if America’s entire corn crop and soybean crop were used to produce biofuels, it would only cover 12 per cent of the US’s annual gasoline usage and six per cent of the US’s diesel usage (Tokar 2010: 125).

Given the energy inefficiencies of many major biofuels, it is unsurprising that bio-diesel and ethanol processors are utterly dependent on government subsidies. By 2006 it was estimated that the US, Canada and EU were spending US\$11 billion per year in subsidies for the biofuels sector. By 2015 this figure is expected to rise to US\$25 billion (OECD 2008). But the biofuels business does not just get subsidised by the taxpayer via the government, it gets a direct hand-out from the customer at the gas station. To take the example of corn-ethanol again, recently published research has found that one gallon of this fuel has only 67 per cent of the Btu (British thermal units) of energy contained in a gallon of gasoline. But sadly for the car driver, fuel is bought per gallon rather than per Btu, and the price of ethanol is almost invariably over 67 per cent of the price of gasoline. Thus, rather than reducing the price of fuel for the consumer, corn-ethanol may often be increasing it (Albino et al. 2012: 4).

Although the biofuels boom defies common sense when judged on the grounds of efficiency and environmental sustainability, from an agribusiness perspective the benefits of first-generation biofuels production are perfectly clear. Corn and soybeans are the primary crops for ethanol and biodiesel production respectively and Monsanto and DuPont have more proprietary claims over corn and soybeans than any other crop. By 2002, Monsanto controlled 38 per cent of the world's corn seed market (excluding China) and 20 per cent of the soybean seed market, while DuPont controlled 27 per cent of the corn seed market and 15 per cent of the soybean seed market (ETC 2003: 7). Moreover, because these crops are bioengineered to be tolerant towards the application of huge amounts of herbicide, seed sales are also tied in with agrochemicals sales for companies within the Agro-Core. Thus, joining the Trader-Core to facilitate and champion the development of the biofuels sector was a no-brainer for firms such as Monsanto and DuPont. The appeal of biofuels for the agro-biotech companies was further underscored by the fact that the biofuels sector could be a Trojan horse for GM products in areas of the world which were more averse to agro-biotechnology than the US (Shattuck 2008). In particular, the regulatory barriers to transgenic crops within the EU could be circumvented and the overall scepticism felt by many consumers in regards to GM food could be offset. What is more, John Deere has supported the spike in biofuels production because it has increased the incomes of the company's main clients: the large, commercial farmers and it has also increased the global acreage of land used for agricultural production. And these two factors in turn have led to an overall increase in sales of its large specialist farm machinery (Blumenthal 2012).

The firms within the Trader-Core have also benefited greatly from the biofuels boom. Due to the extensive control that they have over the processing of raw agricultural commodities, they benefit directly from supplying the processed crops used in ethanol and biodiesel feedstocks. Moreover, they are heavily involved in the actual production of biofuels. Indeed, ADM has the largest share of control over world ethanol production, with seven per cent of global capacity; and Bunge has the seventh largest share (Chan and Reiner 2011: 11). And Cargill has been starting big operations with farmer cooperatives in Europe and North America in biodiesel production (Milling & Baking News 2005: 46). All three companies have also been spreading their pecuniary ambit over Indonesia's palm oil-biodiesel complex and Brazil's sugar ethanol industry. The Trader-Core's expansion into the Brazilian ethanol industry was perhaps typified by the joint venture that ADM embarked on in 2008 with a company controlled by Antonia Cabrera – one of the country's former agricultural ministers (Cameron 2008).

What is more, the Trader-Core has benefited indirectly from the biofuels boom because, in the context of declining consumption of grain based products, the diversion of corn and soybeans into ethanol and biodiesel production has helped tame 'excess capacity'. In fact, the curtailment of 'excess capacity' has quickly given rise to fear of 'scarcity' and this shift has created conditions of widespread uncertainty within the world food system. With the new spectre of food shortages looming in the background, societies are increasingly dependent on the grain traders. The Trader-Core has research offices all over the globe and thus enjoys unrivalled access to information about the production and distribution of raw agricultural commodities (Arsenault 2011). So up to a point, the greater the market volatility, the greater the value of the Trader-Core's ex-

tensive trading capabilities and the greater the value of the Trader-Core's exclusive knowledge of world food markets.⁴ Partly for that reason, the dominant grain merchants have sought to cultivate an environment of 'controlled instability' in the world food system (Krebs 1992: 305). In return for a hefty fee, they offer their customers expeditious 'solutions' for managing the price volatility and food shortage problems that they have played no small part in creating.

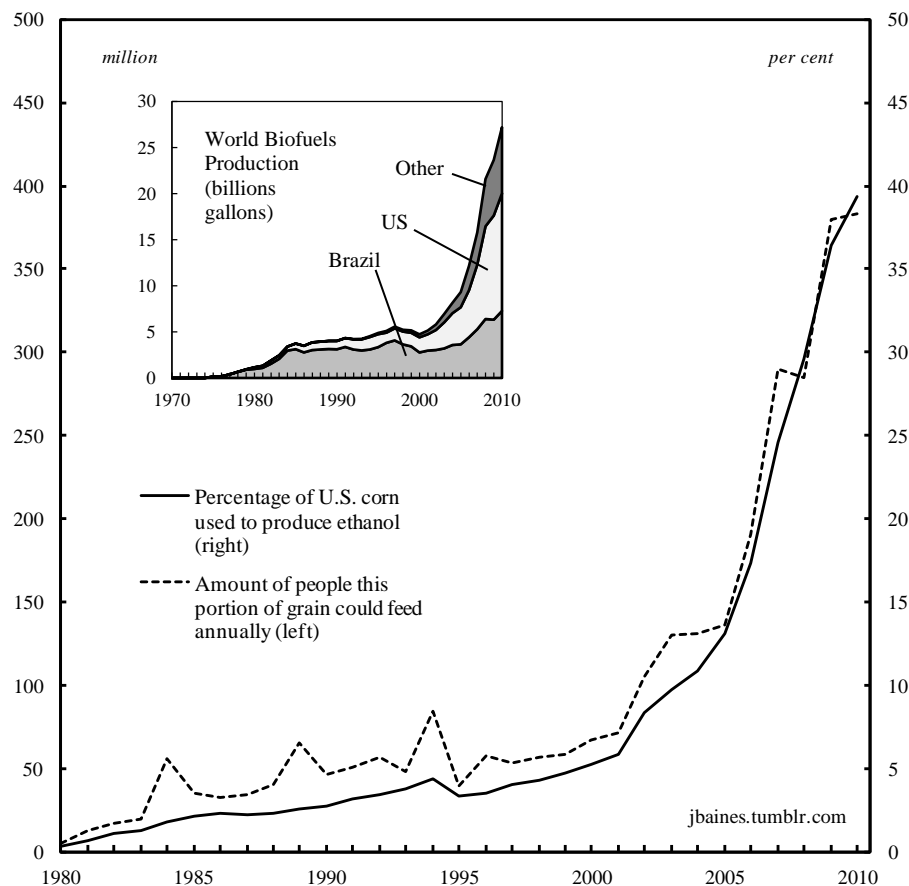


FIGURE 8. The biofuels boom as the redistribution of food

Source: Average world grain consumption per capita from US Department of Agriculture, Production, Supply and Distribution, electronic database, at <http://www.fas.usda.gov/psdonline> [accessed 30 May 2012], and World Population Prospects: The 2010 Revision Population Database, at <http://www.esa.un.org/unpp> [accessed 30 May 2012]. US corn use data from <http://www.ers.usda.gov/data-products/feed-grains-database/> [accessed 27 June 2012].

Notes: Estimate for the amount of people the US corn used for feed stocks could feed annually based on annual estimated world grain consumption per capita.

However, it is worth noting that not all food corporations operating within the world food system have backed the rapid expansion of the first-generation biofuels sector. Dominant food conglomerates including Kraft, Pepsi-Co, ConAgra and General Mills have joined forces with the second largest US supermarket chain Kroger and the

world's second largest meatpacker, Tyson, in a 'Food Before Fuel' lobbying campaign aimed at rolling back America's ethanol mandates (Circui 2008).⁵ The world's largest food manufacturer, Nestlé, has also released public statements decrying the effects of the biofuels boom. These companies' ostensible complaint against the biofuels sector is that it is overly reliant on government support and that this reliance distorts 'supply' and 'demand'. But their real grievance is that the increased diversion of food into fuel production increases the costs of inputs and inventory for their own businesses. With more crops diverted into the biofuels sector, raw agricultural commodity prices rise,

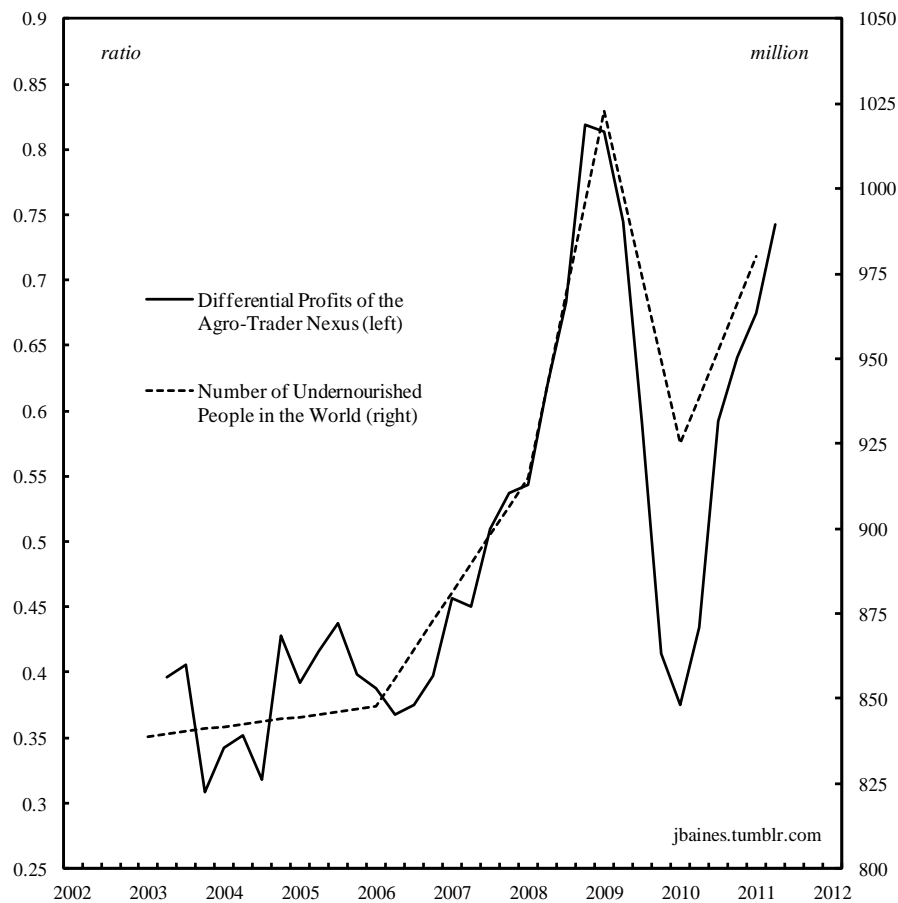


FIGURE 9. Global hunger levels and the differential profits of the Agro-Trader nexus

Source: Undernourishment figures for 2001–10 obtained from FAO (2010: 8, 9, 50). Last observation is provisional and is taken from World Bank (2011). Cargill data for 2000Q4–2004Q2 taken from the Wall Street Journal, Financial Times and Business Source Premier; data for 2004Q3–2010Q4 taken from company website: cargill.com/company/financial/index.jsp [accessed 30 May 2012]. All other data taken from Compustat through WRDS; series code: NIQ.

Notes: Differential profits of the Agro-Trader nexus is the ratio between the average quarterly profits per firm of Archer Daniels Midland, Bunge, Cargill, Deere, DuPont and Monsanto and the average profits per firm of the Compustat 500. The data are presented as a one-year moving average.

price volatility increases and the hedging practices and profit margins of firms in the Food-Core and Retail-Core come under pressure. Indeed, as one may recall from Figure 4, Food-Core and Retail-Core firms have achieved little beyond differential pecuniary stagnation during the biofuels boom.⁶

Having said all of this, one should remain cognisant of the fact that the major victims of the increased costs of raw agricultural commodities are not the dominant food manufacturing and retail corporations, but rather the vast swathe of humanity suffering from food insecurity. Indeed for the world's poorest people who spend 60–80 per cent of their income on food, sudden food price rises can be catastrophic. By way of closing the circle in the analysis, Figure 9 presents data on global hunger levels alongside data on the profits of the Agro-Trader nexus relative to the firms listed in Compustat 500. The strikingly tight correlation suggests that the redistribution of business profits towards the Agro-Trader nexus was in part brought about by a redistribution of food away from the world's poor via food price inflation. As the figure clearly shows, since the turn of the millennium, the Agro-Trader nexus's share of dominant capitalist profits increases when global hunger levels rise and its share of dominant capitalist profits declines when global hunger levels fall. More analysis of the multifarious power processes behind food price inflation needs to be conducted; however it seems likely that the Agro-Trader nexus's facilitation and championing of the first-generation biofuels boom was key. As Figure 8 indicates, in 2010 almost 40 per cent of America's corn crop was used to produce ethanol and this amount of corn could have fed around 350 million people given average world grain consumption levels. In short, the dramatic increase in biofuels production, particularly as it pertains to the corn-ethanol business, is not only dubious from an environmental standpoint, it has contributed to the emergence of structural scarcity within the world food system.

Conclusions

This paper offers the contours of a new research agenda for scholars seeking to comprehend the shifts in business power over the world food system. The analysis provided here represents just a starting point for a critical theoretical venture that has multiple possibilities. More specifically, I have demonstrated the analytical potential of using sectoral profit share and differential profit data to gauge the power shifts between groups of corporations in the world food system. Such an analysis requires capital to be disaggregated and accumulation to be understood not as an overarching structural phenomenon, but rather as an ongoing process of intra-capitalist conflict over the re-ordering of human and non-human life. This method of progressive disaggregation illuminates some interesting power processes within the world food system. Two interrelated insights are particularly important.

First and foremost, the research casts doubt on the prevalent view within IPE literature that there has been a shift in power away from food manufacturers, in favour of food retailers. On a sectoral level, the combined profit share of food retailers and wholesalers has declined significantly during the recent period of rapid food price inflation. And when one examines the differential profit data one can see that the domi-

nant supermarkets have been experiencing little more than pecuniary stagnation since the mid-1990s. What is more, the earnings performance of the major supermarkets appears to move in sync with that of the dominant food conglomerates. This synchronicity suggests that the business interests of the dominant food retailers and food manufacturers are more closely aligned than the supermarket mastery thesis suggests. Overall these findings indicate that we should be circumspect about arguments that lay a great deal of emphasis on the increasing role that major retailers play in setting the terms of access to food supply chains and in shaping consumption patterns. Although these developments may have had a great impact on farmers, small food manufacturing firms and consumers, they do not seem to have given major retailers great pecuniary leverage over other major corporations operating in the twenty-first century world food system.

Secondly, my findings indicate that in recent years the real shift in power in the world food system has not been from the food manufacturers to the food retailers, but rather from the major food manufacturers and food retailers to what I term the Agro-Trader nexus. I argue that instead of being passive ‘price takers’, the firms belonging to the Agro-Trader nexus have actively sought to restructure the global political economy of food in a way that not only increases their own profit growth but also limits the potential growth of profits of other groups of firms within food supply chains. It is very possible that the Trader-Core has contributed to food price spikes through its facilitation of ‘non-commercial’ activity in commodities futures markets. But for the time being this possibility cannot be assessed due to the absence of relevant data. I thus instead incline towards the view that the primary vehicle of the Agro-Trader nexus’s restructuring of the political economy of food has been the first-generation biofuels boom. The boom has had profound implications, not only for corporate control and global undernourishment, but also for the categories that we use to understand such phenomena. Indeed, given the wholesale opening of agriculture to biofuels production one may even ask whether the concept of the world food system as a distinct political economic arena still has analytical currency.

To sum up, the cost-benefit analysis of soaring biofuels production could hardly be more stark. By redistributing energy away from the world’s poor to the world’s combustion engines, the biofuels boom has contributed to the emaciation of bodies, on the one hand; while augmenting the Agro-Trader nexus’s differential earnings, on the other. Needless to say, we should have no illusions about the pecuniary motivations of those corporations that have fought against the extensive government support for first-generation biofuels production. But nonetheless, putting an end to the first-generation biofuels debacle is a necessary step that must be taken if we are to work towards the construction of a world food order where no one goes hungry.

Notes

I would like to thank Jonathan Nitzan, Sandy Brian Hager and the anonymous reviewers for their very helpful comments. I am also grateful to Ontario’s Ministry of Training, Colleges and Universities for awarding me an Ontario Graduate Scholarship in support of my research. The usual disclaimers apply.

1. Market value figures as of May 12, 2012. Cargill's market value estimated in Blas, 2012.
2. The Retail-Core proxy combines the quarterly data for firms in 'Grocery Stores' dataset (NAICS 4451 – 445120) less the firms headquartered outside of the US from the Compustat database with net income data from the Thomson Reuters Datastream database for the following non-US firms (name, followed by national headquarters): Ahold (Netherlands); Carrefour (France); Companhia Brasilia (Brazil); Delhaize (Belgium); Ito-Yokado (Japan); Metro (Germany); Sainsbury's (UK); Seven & i (Japan); Tesco (UK). Wal-Mart net income data was included in 'Grocery Stores' dataset for the first quarter of 1988 onwards. The reason is that, in that year, Wal-Mart began to sell groceries through its newly established 'Supercenters'. The constituent firms for the Trader-Core proxy are ADM, Cargill and Continental from 1995–9; and ADM, Bunge and Cargill from 1999–2012. Trader-Core data obtained from Forbes Magazine, Wall Street Journal, Financial Times, Business Source Premier and Compustat. The Trader-Core time-series only goes back to 1995 because of the unavailability of net income data prior to that year. Net income data for Monsanto from 1996–2000 was included in the Agro-Core dataset even though it was not yet listed under the 'Crop Production' category of NAICS. Indeed, Compustat only contains data for the re-constituted Monsanto firm that came into existence in 2000 – four years after the preceding Monsanto firm became an agro-biotech giant. Quarterly data for Monsanto (1996–2000) were interpolated from annual figures obtained from the Fortune 500 listing of Fortune Magazine, April issues 1997–2001. Firms that gained most of the revenue from the sale of non-food commodities such as Unilever or beverage companies such as Coca-Cola were omitted from the Food-Core index. The Agro-Core time-series only goes back to 1982 because of the lack of sufficient data prior to that year.
3. Future investigations could move beyond the biofuels boom and illuminate the redistributive effects of other forms of institutionalised waste. One form of institutionalised waste that deserves particular attention relates to the 'buy now, throw away later' habits of overconsumption engendered by the sales strategies of supermarkets and food manufacturers. According to one study, the proportion of edible food that is wasted in the US has increased from 30 per cent in 1974 to around 40 per cent, and much of this wastage occurs within American households (Hall et al. 2009).
4. As much is admitted by the major grain traders themselves. Discussing Bunge's strong pecuniary performance in the wake of Russia's sudden grain export ban, the company CEO remarked: 'I hate to say that we benefit . . . [But] margins expand at these moments because markets get nervous . . . It plays to our strengths. Because of our global network these dislocations give us opportunities'. Similarly in a letter to shareholders, ADM is almost revelling in the dynamics of disaster: 'A year like 2011 highlights the benefit of our global sourcing, transportation and processing network. When civil unrest in the Middle East, drought and trade embargoes in the Black Sea, the earthquake and Tsunami in Japan and flooding in the USA caused disruptions – in supply, demand and the trade flows that connect them – our team sourced alternative supply, managed risk and continued delivering crops and products to serve vital needs for food and energy' (as cited by Murphy et al. 2012: 24–5). What the Trader-Core neglect to mention, of course, is that they have actively contributed to the price volatility and uncertainty by engendering structural scarcity in the world food system through their support and facilitation of the biofuels boom.
5. Tyson appears to have a conflicted position in regard to biofuels. Despite lobbying against ethanol subsidies, in 2007 it embarked on a joint venture with the then third largest oil company in the world – ConocoPhillips – to convert animal fats, rendered from poultry, pork and beef into biodiesel. The joint venture was premised on a one dollar per gallon tax credit that the two companies managed to secure from the Bush administration. However, the National Biodiesel Board – a trade organisation representing ADM, Cargill and other major corporations – was up in arms. It mobilised its friends in Congress and in late 2008, the tax credit was halved to 50 cents per gallon. This legislative revision had baleful effects for Tyson's and ConocoPhillips' biofuels project, and in 2009 their joint venture folded (Donmoyer 2007; Davis 2009). Two points can be made from this episode. Firstly, it shows that there is a redistributive struggle within the biofu-

els sector over the attainment of government subsidies. Secondly, given Conoco-Phillips' involvement in biodiesel and indeed the entry of other big energy firms in the biofuels sector, there are interesting research questions regarding the conflict and concordance of pecuniary interests between firms that are traditionally associated with food and agriculture and firms that are not. These points underline the need to both broaden and deepen the method of progressive disaggregation presented in this paper.

6. The emergence of second-generation biofuels made from non-edible biomass, such as forest residues and straw, has opened up another space for intra-capitalist struggle within the biofuels sector, as evidenced in the creation of the Alternative Biofuels Coalition in 2008. The coalition was formed to represent second-generation biofuels firms that sought to secure government subsidies by distancing themselves from the far more politically controversial first-generation biofuels sector. The emergence of this coalition underscores the point that there has been a redistributive struggle over government subsidies within the biofuels sector (Rosiak 2008). However, it seems that firms in the Agro-Core and the Trader-Core may be subsuming these internecine conflicts through extending their pecuniary ambit over the second-generation biofuels industry. Indeed, three of the four axial firms in the Agro-Trader nexus – Archer Daniels Midland, Deere & Co. and Monsanto – agreed, in 2008, to collaborate on a project to capture plant residue and use it for fuel. The other axial firm in the Agro-Trader nexus, DuPont, has also been pursuing second-generation biofuels projects, with a particular focus on cellulosic ethanol (ETC 2011; Herdon 2012).

Notes on contributor

Joseph Baines is a PhD candidate in the Department of Political Science at York University, Toronto. His research focuses on the global agricultural commodities traders and the restructuring of the world food system. He also works as a volunteer at FoodShare Toronto.

References

- Ailawadi, K.L. (2001), 'The Retail Power-Performance Conundrum: What Have we Learned?' *Journal of Retailing*, 77 (3), pp. 299–318.
- Albino, D.K., Bertrand, K.Z. and Bar-Yam, Y. (2012), 'Food for Fuel: The Price of Ethanol', New England Complex Systems Institute, 4 October. Available from: <http://necsi.edu/research/social/foodprices/foodforfuel/> [accessed 14 December 2012].
- Arsenault, C. (2011), 'Glencore: Profiteering from Hunger and Chaos', *Al Jazeera*, 9 May. Available from: <http://www.aljazeera.com/indepth/features/2011/05/20115723149852120.html> [accessed 30 May 2012].
- Baran, P.A. and Sweezy, P.M. (1966), *Monopoly Capital: An Essay on the American Economic and Social Order* (New York: Monthly Review Press).
- Blas, J. (2011), 'Cargill is clue to value of Glencore', *Financial Times*, 12 January. Available from: <http://www.ft.com/intl/cms/s/0/13a05178-24c2-11e0-a919-00144feab49a.html#axzz2RL06KPJ4> [accessed 30 May 2012].
- Blumenthal, R. (2012), 'Big Green Finds Fertile Fields Abroad', *Barron's*, 24 March, Available from: <http://online.barrons.com/article/SB5000142405311190464670457729378236862246.html> [accessed 30 May 2012].
- Bovard, J. (1995), 'Archer Daniels Midland: A Case Study in Corporate Welfare', *CATO Policy Analysis*, 26 September, no. 241. Available from: <http://www.cato.org/pubs/pas/pa-241.html> [accessed 30 May 2012].

- Burch, D. and Lawrence, G. (2005), 'Supermarket Own Brands, Supply Chains and the Transformation of the Agri-Food System', *International Journal of Sociology of Agriculture and Food*, 13 (1), pp. 1–16.
- Burch, D. and Lawrence, G. (eds) (2007), *Supermarkets and Agri-food Supply Chains: Transformations in the Production and Consumption of Foods* (Cheltenham: Edward Elgar).
- Burch, D. and Lawrence, G. (2009), 'Towards a Third Food Regime: Behind the Transformation', *Agriculture and Human Values*, 26 (2), pp. 267–79.
- Cameron, D. (2008), 'Agribusiness Group Forms to Protect Ethanol Subsidies', *Wall Street Journal*, 25 July, Available from: <http://online.wsj.com/article/SB121694492314783063.html> [accessed 30 May 2012].
- Cargill (2011), Annual Report 2011. Available from: <http://www.cargill.com/wcm/groups/public/@ccom/documents/document/2011-annual-report.pdf> [accessed 30 May 2012].
- Carney, D. (1995), 'Dwayne's World', *Mother Jones*, July/August. Available from: <http://www.motherjones.com/politics/1995/07/dwaynes-world> [accessed 30 May 2012].
- Chan, J.-H. and Reiner, D. (2011), 'Dynamics of Evolution in the Global Fuel-Ethanol Industry', *Cambridge Working Paper in Economics*, CWPE 1129. Available from: <http://www.econ.cam.ac.uk/dae/repec/cam/pdf/cwpe1129.pdf> [accessed 30 May 2012].
- Circui, A. (2008), 'Crops for Biofuel and Biodiesel, Agribusiness Urges', *Economy Watch*, 25 July. Available from: <http://www.economywatch.com/renewable-energy/news/crops-for-biofuel-industry.html> [accessed 30 May 2012].
- Committee on Foreign Relations (1977), *Multinational Corporations and United States Foreign Policy, Hearings before the Subcommittee on Multinational Corporations, Ninety-Fourth Congress, Second Session on International Grain Companies*, 18, 23 and 24 June, 1976, Part 16 (Washington, DC: US Government Printing Office).
- Davis, J. (2009), 'Tax Credit Loss Idles Conoco/Tyson Biodiesel Plant', *Domestic Fuel Magazine*, 14 May. Available from: <http://domesticfuel.com/2009/05/14/tax-credit-loss-idles-conocotyson-biodiesel-plant/#comments> [accessed 30 May 2012].
- Deutsche Bank (1999), 'GMOs are Dead', report. Available from: <http://www.cqs.com/gmosdead.htm> [accessed 30 May 2012].
- Donmoyer, R.J. (2007), 'Democrats Target Tax Break for ConocoPhillips, Tyson (Update2)', *Bloomberg*, 20 April. Available from: <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aiPjJ9tLNx94&refer=home> [accessed 30 May 2012].
- Earth Policy Institute (2012), 'Data Centre: Food and Agriculture'. Available from: http://www.earth-policy.org/?/data_center/C24/ [accessed 30 May 2012].
- ETC (2003), 'Oligopoly Inc. – Concentration in Corporate Power: 2003', *Communique* no. 82, November/December. Available from: <http://www.etcgroup.org/node/136> [accessed 30 May 2012].
- ETC (2008), 'Who Owns Nature? Corporate Power and the Final Frontier in the Commodification of Life', *Communique* no. 100, October. Available from: <http://www.etcgroup.org/content/who-owns-nature> [accessed 30 May 2012].
- ETC (2011), 'Who will Control the Green Economy?', *Communique* no. 107, November. Available from: <http://www.etcgroup.org/content/who-will-control-green-economy-0> [accessed 30 May 2012].
- FAO (2010), *The State of Food Insecurity in the World* (Rome: Food and Agriculture Organization of the United Nations).
- Falkner, R. (2009), 'The Troubled Birth of the "Biotech Century": Global Corporate Power and Its Limits', in J. Clapp and D. Fuchs (eds), *Corporate Power in Global Agrifood Governance* (Cambridge, MA: Massachusetts Institute of Technology), pp. 225–52.
- Friedmann, H. and McMichael, P. (1989), 'Agriculture and the State System: The Rise and Decline of National Agricultures, 1870 to the Present', *Sociologia Ruralis*, 19 (2), pp. 93–117.

- Gereffi, G. (1994), 'The Organization of Buyer-Driven Global Commodity Chains: How US Retailers Shape Overseas Production Networks', in G. Gereffi and M. Korzeniewicz (eds), *Commodity Chains and Global Capitalism* (Westport, CT: Greenwood Publishing Group), pp. 95–122.
- Gereffi, G. and Christian, M. (2010), 'Trade, Transnational Corporations and Food Consumption: A Global Value Chain Approach', in C. Hawkes et al. (eds), *Trade, Food, Diet and Health: Perspectives and Policy Options* (Oxford: Blackwell), pp. 91–110.
- Gereffi, G. and Korzeniewicz, M. (eds) (1994), *Commodity Chains and Global Capitalism* (Westport, CT: Greenwood Publishing Group).
- Gibbon, P. (2001), 'Upgrading Primary Production: A Global Commodity Chain Approach', *World Development*, 29 (2), pp. 345–63.
- Gibbon, P., Bair, J. and Ponte, S. (2008), 'Governing Global Value Chains: An Introduction', *Economy and Society*, 37 (3), pp. 315–38.
- Goodman, D., Sorj, B. and Wilkinson, J. (1987), *From Farming to Biotechnology: A Theory of Agro-Industrial Development* (New York: Basil Blackwell).
- GRAIN (2007), 'Agrofuels Special Issue', *Seedling*, July, Available from: http://www.odg.cat/documents/enprofunditat/Deute_ecologic/seed-07-07-en.pdf [accessed 30 May 2012].
- Hall, K.D., et al. (2009), 'The Progressive Increase of Food Waste in America and its Environmental Impact', *PLoS ONE*, 4 (11): e7940. doi:10.1371/journal.pone.0007940. Available from: <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0007940> [accessed 20 December 2012].
- Headey, D. and Fan, S. (2011), Reflections on the Global Food Crisis: How Did It Happen? How Has It Hurt? And How Can We Prevent the Next One?, *International Food Policy Research Institute, Research Monograph*, no.165 (Washington DC: IFPRI).
- Heffernan, W. (1999), Consolidation in the Food and Agriculture System, report to the National Farmers Union. 5 February. Available from: <http://www.foodcircles.missouri.edu/whstudy.pdf> [accessed 30 May 2012].
- Hendrickson, M. and Heffernan, W. (2007), *Concentration of Agricultural Markets, 2002 & 2007*. Available from: [foodcircles.missouri.edu/consol.htm](http://www.foodcircles.missouri.edu/consol.htm) [accessed 30 May 2012].
- Hendrickson, M. et al. (2001), 'Consolidation in Food Retailing and Dairy', *British Food Journal*, 103 (10), pp. 715–28.
- Herndon, A. (2012), 'DuPont Betting on Cellulosic Biofuel after BP, Coskata Setbacks', *Bloomberg*, 30 November. Available from: <http://www.bloomberg.com/news/2012-11-30/dupont-betting-on-cellulosic-biofuelafter-bp-coskata-setbacks.html> [accessed 20 December 2012].
- Holt-Giménez, E. and Patel, R. (2009), *Food Rebellions! Crisis and the Hunger for Justice* (Cape Town: Pambazuka Press).
- Howie, M. (2000), 'Bunge Expands Latin American Fertilizer Business', *Feedstuffs*, 72 (16), p. 3.
- Kneen, B. (2002), *Invisible Giant: Cargill and its Transnational Strategies* (London: Pluto Press).
- Krebs, A.V. (1992), *Corporate Reapers: The Book of Agribusiness* (Washington, DC: Essential Books).
- Lagi, M., Bar-Yam, Y., Bertrand, K.Z., Bar-Yam, K.Z. and Bar-Yam, Y. (2011), 'The Food Crises: A Quantitative Model of Food Prices including Speculators and Ethanol Conversion', *New England Complex Systems Institute, Research Paper*, 21 September. Available from: <http://necsi.edu/research/social/foodprices.html> [accessed 20 December 2012].
- Lindell, E. (1982), 'US-Soviet Grain Embargoes: Regulating the MNCs', *Food Policy*, 7 (3), pp. 240–6.
- Marion, B. and Kim, D. (1991), 'Concentration Change in Selected Food Manufacturing Industries: The Influence of Mergers vs. Internal Growth', *Agribusiness*, 7 (5), pp. 415–31.
- Meyer, P. (2000), 'Food Companies Competing with "Dot-coms" B-B Conglomerators', *Milling and Baking News*, 21 March, p. 18.
- Meyer, P. (2005), 'Producers "Up to their Eyeballs" in High Fructose Corn Syrup', *Milling & Baking News*, 31 May, p. 48.

- Milling & Baking News (1998), 'Cargill and Monsanto Alliance Creates Possibilities for Food', *Milling & Baking News*, 26 May, p. 11.
- Milling & Baking News (2002), 'Bunge's Intense Focus on Oilseeds Highlighted by Cereol Acquisition', *Milling & Baking News*, 29 October, p. 1, 24–6.
- Milling & Baking News (2003), 'Specialty Ingredients Effort Part of New Bunge, DuPont Venture', *Milling & Baking News*, 14 January, p. 10.
- Milling & Baking News (2005), 'Cargill to Invest in New Biodiesel Facility in Germany', *Milling & Baking News*, 6 September, p. 46.
- Milling & Baking News (2006), 'Bunge and DuPont Broaden Soy Venture, Launch TREUS Brand', *Milling & Baking News*, 12 September, p. 20.
- Morgan, D. (1980), *Merchants of Grain: The Power and Profits of the Five Giant Companies at the Center of the World's Food Supply* (New York: Viking).
- Murphy, S. (2010), 'Biofuels: Finding a Sustainable Balance for Food and Energy', in G. Lawrence, K. Lyons and T. Wallington (eds), *Food Security, Nutrition and Sustainability* (Abingdon: Earthscan), pp. 223–37.
- Murphy, S., Burch, D. and Clapp, J. (2012), 'Cereal Secrets: The World's Largest Grain Traders and Global Agriculture', Oxfam Research Reports, August. Available from: www.oxfam.org/sites/www.oxfam.org/files/rr-cereal-secrets-grain-traders-agriculture-30082012-en.pdf [accessed 20 December 2012].
- Nitzan, J. and Bichler, S. (2004), 'Dominant Capital and the New Wars', *Journal of World-Systems Research*, 10 (2), pp. 254–327.
- Nitzan, J. and Bichler, S. (2009), *Capital as Power: A Study of Order and Creorder* (Abingdon: Routledge).
- OECD (2008), 'Biofuel Support Policies: An Economic Assessment'. Available from: <http://www.oecd.org/tad/agriculturaltrade/biofuelsupportpoliciesaneconomicassessment.htm> [accessed 30 May 2012].
- Östensson, O. (2012), 'The 2008 Commodity Boom: Did Speculation Play a Role?', *Mineral Economics*, (25) 1, pp. 17–28.
- Page, G. (2012), 'Speech: Trusting Photosynthesis: Thoughts on the Future of Global Food Production'. Available from: <http://www.cargill.com/news/speeches-presentations/trusting-photosynthesis/index.jsp> [accessed 30 May 2012].
- Palaez, V. and Schmidt, W. (2004), 'Social Struggles and the Regulation of Transgenic Crops in Brazil', in K. Jansen and S. Vellema (eds), *Agribusiness & Society: Corporate Responses to Environmentalism, Market Opportunities and Public Regulation* (London: Zed Books), pp. 232–60.
- Palmer, A. (2006), 'Harvest Time for Ethanol', *DC WATCH - Corporate Counsel*, 6 (6), pp. 1–2.
- Patel, R. (2007), *Stuffed and Starved: Markets, Power and Hidden Battle for the World Food System* (Toronto: HarperCollins Publishers).
- Pollan, M. (2006), *The Omnivore's Dilemma: A Natural History of Four Meals* (New York: The Penguin Press).
- Rosiak, L. (2008), 'Power Struggle: Division with Biofuels Community Complicates the Energy Equation', 24 July. Available from: <http://www.opensecrets.org/news/2008/07/power-struggle-division-within.html> [accessed 30 May 2012].
- Sanders, D.R. and Irwin, S.H. (2011), 'New Evidence on the Impact of Index Funds in US Grain Futures Markets', *Canadian Journal of Agricultural Economics*, 59 (4), pp. 519–32.
- Schlosser, E. (2001), *Fast Food Nation: The Dark Side of the All-American Meal* (Boston: Mariner Books/Houghton Mifflin Harcourt).
- Shattuck, A. (2008), 'The Agrofuels Trojan Horse: Biotechnology and the Corporate Domination of Agriculture', in R. Jonas (ed.), *Agrofuels in the Americas. A Food First Book*. Oakland: Institute for Food and Development Policy, pp. 89–101. Available from: http://www.foodfirst.org/files/pdf/Agrofuels_in_the_Americas.pdf [accessed 30 May 2012].
- Sirait, M.T. 2009. Indigenous peoples and oil palm expansion in
- Shiva, V. (2000), *Stolen Harvest: The Hijacking of the Global Food Supply* (London: Zed Books).

- Stavro, B. (1985), 'Quit? Hell No!', *Forbes*, 26 August, p. 35.
- Tokar, B. (2010), 'Biofuels and the Global Food Crisis', in F. Magdoff and B. Tokar (eds), *Agriculture and Food in Crisis: Conflict, Resistance and Renewal* (New York: Monthly Review Press).
- Van der Ploeg, J. (2010), 'The Food Crisis, Industrialized Farming and the Imperial Regime', *Journal of Agrarian Change*, 10 (1), pp. 98–106.
- Vellema, S. (2004), 'Monsanto Facing Uncertain Futures: Immobile Artefacts, Financial Constraints and Public Acceptance of Technological Change', in K. Jansen and S. Vellema (eds), *Agribusiness & Society: Corporate Responses to Environmentalism, Market Opportunities and Public Regulation* (London: Zed Books), pp. 232–60.
- Weiss, M.J. (1990), 'The High-Octane Ethanol Lobby', *New York Times*, 1 April. Available from: <http://www.nytimes.com/1990/04/01/magazine/the-high-octane-ethanol-lobby.html> [accessed 20 May 2012].
- Whitmore, A. (1999), 'Monsanto: Corporate Food Gamble?' in J. Madley (ed.), *Hungry for Power: The Impact of Transnational Corporations on Food Security* (London: UK Food Group).
- Winson, A. (1993), *The Intimate Commodity: Food and the Development of the Canadian Agro-Industrial Complex* (Toronto: Garamond Press).
- World Bank (2011), 'Food Price Hike Drives 44 Million People into Poverty', press release no. 2011/333/PREM. Available from: <http://reliefweb.int/report/bangladesh/food-price-hike-drives-44-million-people-poverty> [accessed on 30 May 2012].
-